

Small Business Management Research Reports

Simulation Training For Small Business Executive Development

Prepared by the

BUREAU OF BUSINESS RESEARCH
THE UNIVERSITY OF TEXAS

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Simulation Training For Small Business Executive Development

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Under the

**SMALL BUSINESS ADMINISTRATION
MANAGEMENT RESEARCH GRANT PROGRAM**

APRIL 1963

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Foreword

This Small Business study, *Simulation Training for Small Business Executive Development*, has been conducted and prepared under the direction of Dr. John R. Stockton, Project Director for The University of Texas.

The research was financed by a grant made by the Small Business Administration, United States Government, under the authority of Public Law 699 (85th Congress).

Only a limited number of copies of this report have been printed. It is available for reference in any of the Small Business Administration offices throughout the United States and at many reference libraries. Copies of the report may be purchased for \$1.50 directly from the Bureau of Business Research, The University of Texas.

Summaries of this study have been printed and are available in reasonable quantities. These summaries may be secured from S.B.A. field offices or from the Small Business Administration, Washington 25, D.C.

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APRIL 1963

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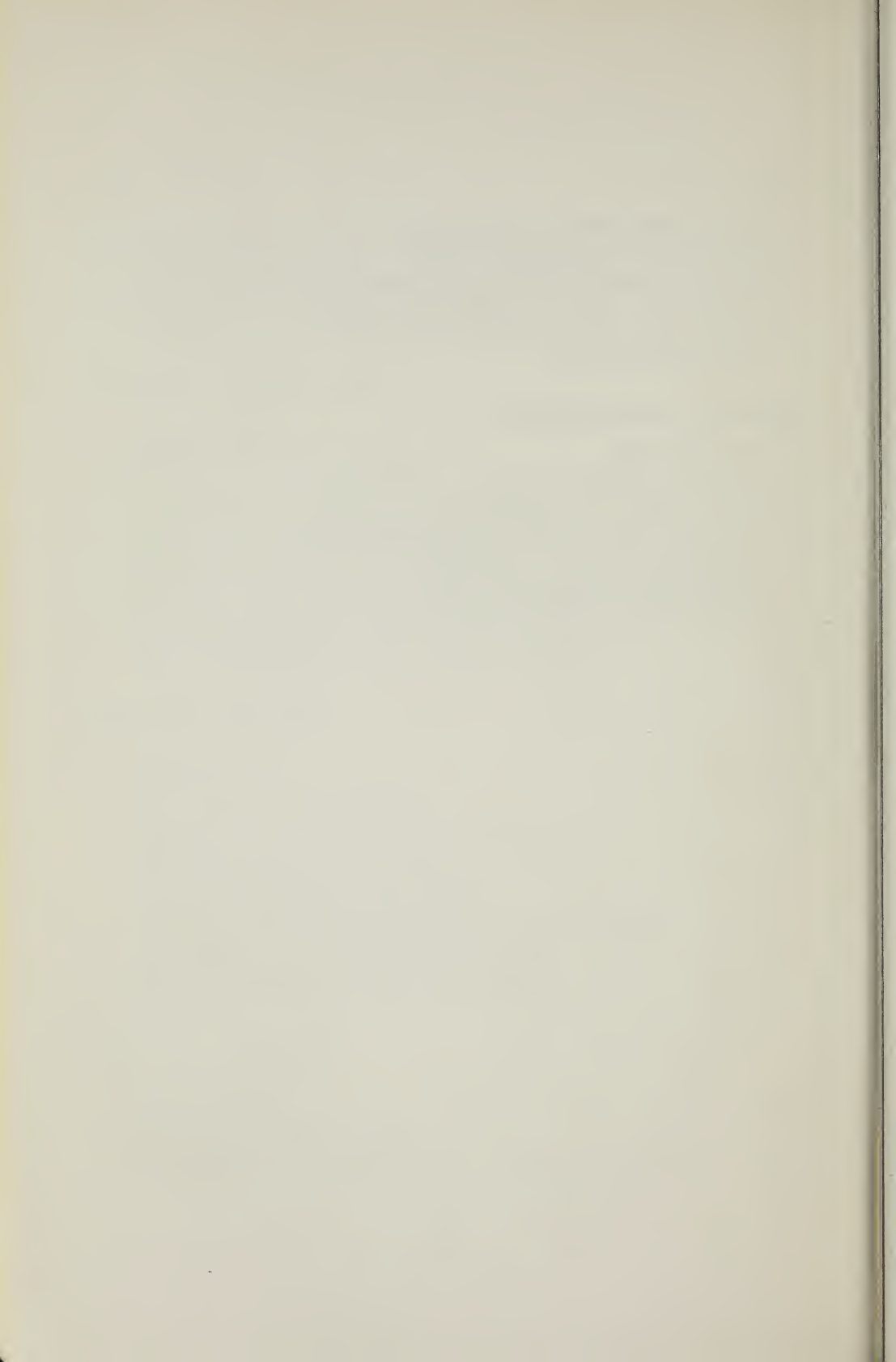
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Preface

This report is the second in a series describing the nature and the results of tests carried out with the small business executive decision simulation model constructed by a team of four members of the staff of the Bureau of Business Research, The University of Texas. The first report of the series* describes the nature of the simulation model and gives an account of the forms and procedures used in carrying out a simulation exercise. It also includes a description of computer requirements, including data-processing instructions. After preliminary testing of the model (using teams of faculty from The University of Texas and the University of Houston, teams of graduate students of business administration, and teams of businessmen from Austin, Texas), the simulation model was considered to be ready for more extensive tests. The results of these tests are presented in this report.

The seven large and medium-sized Texas cities selected as the proving grounds for the decision-making simulation exercises were Beaumont, Dallas, El Paso, Fort Worth, Houston, Lubbock, and San Antonio. In each city, a local representative assisted in the selection of participants and helped to determine the sites at which the participating teams would actually engage in the top-level decision activity. Each local representative also acted as liaison with the administrators of the exercise who were in Austin. Without the effective assistance of qualified local representatives, the whole procedure would have operated much less smoothly. For example, many problems requiring immediate action were settled on the spot by the local representatives. This prevented the testing from being slowed almost to a standstill because of procedural matters that could best

*Alfred G. Dale, Francis B. May, Charles T. Clark, and P. John Lymberopoulos, *The Small Business Executive Decision Simulation: Administrator's Manual* (Austin: The Bureau of Business Research, The University of Texas, 1963). Participants in a business simulation use *The Small Business Executive Decision Simulation: Operating Manual*, also prepared by the authors listed above. (The *Operating Manual* also appears in facsimile as Appendix IB of the *Administrator's Manual*.)

be solved by someone on the scene rather than by lengthy correspondence. The seven local representatives were:

<i>Name</i>	<i>Institution</i>	<i>City</i>
Leo I. Bakony	Southern Methodist University	Dallas
Wade Hartrick	Texas Western College	El Paso
William J. Hickey	St. Mary's University	San Antonio
Charles D. Kirksey	Lamar Institute of Technology	Beaumont
Billy J. Hodge	University of Houston	Houston
A. Franklin Murph	Texas Christian University	Fort Worth
Fred W. Norwood	Texas Technological College	Lubbock

Much of the credit for the success of this set of tests is due to the effective and untiring efforts of these men. The pages of the report that follow will reveal details of the tests. The results were very encouraging, and appraisals of the model by the participants in the test were extremely gratifying.

JOHN R. STOCKTON
Director

APRIL 1963

Chapter I

Competitive and Operational Problems of Small Firms

The success of a small competitive enterprise, especially a small manufacturer, will depend on the satisfactory solution of problems in two areas comprising (1) the manner in which it adapts to its external market environment and (2) the manner in which its internal operational procedures are organized. In general, the literature on small business problems has placed great emphasis upon the latter group of requirements but has tended to neglect the former. It is clear, however, that the competitive posture of a company is equally as important to its success or survival as is the efficiency and rationality of its internal decision-making process; and any quasi-isomorphic simulation of a small firm should include problems in this area, in addition to requiring the application of technically specialized analytical procedures.

ENVIRONMENTAL PROBLEMS OF THE SMALL FIRM

It is possible to identify several market situations under which small manufacturing firms may operate. Different situations will impose different restraints upon the activities of the firm and will require different tactical approaches to short-run operational problems.

These market situations may be classified as:

1. *Highly fragmented markets with numerous producers, each of which accounts for a relatively very small fraction of total demand*—This is the purely competitive situation of classical economic theory; and, under the postulated conditions, which assume that the product of the industry is qualitatively homogeneous, the demand for the product of any company will be highly responsive to price changes, and the actions of the firm may be undertaken without reference to the possible reactions of specific competing companies. In the long run,

all companies will be charging identical prices in the market and operating plants of approximately equal size.

2. *Dynamic market structures in which conditions make possible both unequal growth rates for firms and the generation of unequal market shares*—The equilibrium conditions of the classical economic model are seldom approximated; this situation occurs for several reasons: (1) because locational considerations lead to unequal spatial distribution of firms and give rise to finite regional markets served by a relatively small number of companies, (2) because companies find it possible to differentiate their product from that of their competitors, or, (3) because, for one reason or another, particular firms are able to establish more efficient internal operating procedures. In any event, a more typical market situation than that envisaged in the classical model is one in which companies have some discretion over, for example, pricing policy, so that different prices for essentially the same product may be possible in a given market, and a situation in which a company must consider the impact of explicit competitive reaction to any market moves it chooses to initiate.

3. *A particular case of the dynamic market in which the industry is composed of a few dominant (large) companies surrounded by peripheral small businesses*—Under modern marketing and technological conditions, this situation frequently characterizes the mature competitive structure of many industries and may be increasingly characteristic of the dynamic growth phases of new industries.

Given the existence of imperfect competitive conditions, scale economies in production and marketing effort, and an industry composed of unequal-sized firms, the competitive problems of the smaller companies become particularly difficult.

If the small company chooses to engage in aggressive action within the market, it runs the risk of stimulating counteraction from its larger competitors. The smaller company can neither undersell its larger competitors nor outspend them in promotional effort for any extended period of time. Consequently, the small company must frequently acquiesce to a position of dependence in the market and content itself with growth at a rate implicitly or explicitly allowed by its larger competitors.

Inability to manipulate or control its environment is typically one of the basic problems of the small manufacturer and leads to behavioral symptoms that are sometimes confused as causes. Thus, failure of small businesses to engage in long-range planning may frequently be due, not to managerial oversight, but to the inapplicability of planning in a situation where the company is

forced to operate on the basis of short-run expedients because it must continually adjust to externally imposed changes in its environment.

The key fact for many, if not most, small firms is that their strategic choices are imposed by forces beyond their control, and the number of degrees of freedom in decision-making is quite limited. If the goal of the firm is corporate expansion over time, the small firm operating in a restrictive market environment must seek to create or find a new set of market conditions under which it can reassume market initiative and generate continued expansion of output and profit.

This type of restrictive situation has been incorporated in the small business simulation model. Aggregate demand in the market is almost wholly determined by factors beyond the control of the competing companies, who may be subjected to varying degrees of outside competitive pressure through manipulation of an exogenous price variable. Under these conditions, the viability of a small firm will depend importantly upon the solutions which it may be able to generate to escape the restrictions limiting its strategy space.

Simulation solutions lie in new product development or new market exploitation, both of which offer companies an opportunity to escape from the rather static demand conditions of their original situation. It should be emphasized, however, that the inclusion of these alternatives as escape solutions in the simulation does not imply that they are necessarily relevant for all small companies under actual conditions. The important point is that companies operating within a restrictive, exogenously controlled environment should *continually seek strategies that will enable them to gain more direct control over environmental parameters*. The simulated situation should be utilized to raise this important question in parallel discussions with the participants, applying the solutions available within the model simply as particular instances of a more general requirement.

INTERNAL OPERATING PROBLEMS

The literature on small business problems provides adequate evidence that these may frequently be ascribed to, or compounded by, inadequate internal control and planning procedures. This inadequacy is frequently due to the fact that the management staff of many small firms may be technically competent in specialized functional areas but seldom possess equal skills in all functional areas relevant to the total operation of the enterprise. Additionally, many small firms do not possess the resources, or else believe they cannot afford, either to

hire personnel to supplement managerial skills already available within the firm or to allocate some portion of available managerial effort to problems such as budgeting, financial planning, market research, and similar activities.

Observation reveals many instances of small manufacturing firms strongly oriented to production or engineering problems but deficient in equally important administrative areas. Thus, Woodruff and Alexander, in examining management errors of ten bankrupt small manufacturers, found the most frequent deficiencies to lie generally in the area of poor financial planning, notably in the failure to maintain adequate records; and in poor coordination between manufacturing and selling activities, notably in the area of market research and product planning.*

Rational participation in the small business simulation depends very largely upon the ability of the teams (1) to initiate search for information regarding their environment, (2) to analyze these data and relate them to the current situation, (3) to establish procedures to evaluate routine data outputs from the program, and (4) to establish planning procedures for forecasting anticipated cash flows and associated short-run financial requirements.

Successful performance of these tasks will not necessarily correlate positively with adequacy of performance in a real environment. Nevertheless, these elements of the decision-making process are necessary conditions for successful decision-making in the real business world. Experience with this simulation model has demonstrated that the achievement of success within the model environment invariably correlates highly with the adequacy of data collection, analysis, and related planning procedures.

*A. M. Woodruff and T. G. Alexander, *Success and Failure in Small Manufacturing* (Pittsburgh: University of Pittsburgh Press, 1958).

Chapter II

Experimental Testing of the Simulation Model

During the period from September 1961 to February 1962, the small business executive decision simulation (computerized model) was tested in seven separate simulation exercises designed to evaluate a proposed technique for carrying on extended simulation exercises, in addition to evaluating the simulation itself as a training and development device for small business management.

Most computerized business simulations are operated on a continuous basis with rapid decision sequences. Participants might be permitted thirty to sixty minutes per decision, allowing from eight to sixteen decisions in an eight-hour simulation session. As presented here, however, this small business simulation is not amenable to such rapid decision sequences. As many as thirty-five routine-decision inputs may be required from a participating team at one time, and additional nonroutine decisions may have to be made concurrently. Experience has shown that a minimum of one and one-half hours is typically required for a group to produce a decision set, and, frequently, a set of decisions may require anywhere from two to three hours to prepare. With experienced administrative and data-processing personnel, the processing time (including computer running and printing time) in a typical simulation session, takes approximately thirty to thirty-five minutes per decision.

In addition to these restrictions upon a continuous simulation exercise, it was felt that most small business enterprises usually do not possess enough resources that their management executives can be absent for periods up to several days in order to attend executive development training sessions at which simulation exercises could be set up for continuous participation. Accordingly, it was determined that the participation by small businessmen in the simulation exercises described here would have to be incorporated into some

type of discontinuous program, which could then be organized in such a way as to make considered decision-making possible with a minimal number of extra calls on executive time.

The plan which was finally adopted for the simulation exercises required the participating groups to make decisions on their own time at intervals of approximately ten to fourteen days, mailing decisions to Austin for processing and running, with two to three days of time elapsing between the dispatch of the decisions and the receipt of the results. During an experimental run extending over a period of sixteen weeks in the summer of 1962, utilizing local business firms in the Austin area, it was determined that this plan was feasible and, in addition, that the continuity of the simulation could be preserved in terms of sustaining the interest of the participating groups.

Experimentation with the simulation began in mid-September 1961, with seven separate simulation exercises organized in seven different cities in Texas. The following tabulation summarizes the location and makeup of each simulation exercise:

<i>Simulation exercise number</i>	<i>Location</i>	<i>Number of participating firms (teams)</i>	<i>Number of individual participants</i>
1	Beaumont	9	37
2	Dallas	8	24
3	El Paso	7	27
4	Fort Worth	6	30
5	Houston	7	30
6	Lubbock	8	32
7	San Antonio	8	37
Total		<u>53</u>	<u>217</u>

Each team of participants (i.e., each simulated firm) consisted of a group of officers all from the same real firm, although one team in each city consisted of faculty members from a local college or university. Organizing the teams or groups within the real firms facilitated intragroup participation in the decision-making, and this approach added a bonus element of real interfirm competition within each simulation exercise. Since from ten to fourteen days elapsed between each mailing of decisions, the participants were able to organize decision-making sessions to suit their joint convenience. After the initial briefing session, held as a joint meeting with all participants in that exercise present, each team operated quite independently, subject only to the requirement that the

decisions from each team be mailed to Austin for processing on the designated dates.

To facilitate administration and communications, each simulation exercise had a local project representative in that city. These individuals were faculty members of local colleges who had received a thorough prior orientation to the simulation, were responsible for the initial organization of the participating teams, and acted as local liaison throughout the simulation exercises.*

Approximately one week prior to the initial briefing session with participants, the local project representatives distributed copies of the *Operating Manual*, a compendium of background information on the simulated companies designed to orient participants to the initial situation. Briefing sessions, which lasted from two to three hours, were conducted by members of the project staff of The University of Texas who were to administer that particular simulation exercise. In general, the first hour of the session was devoted to answering the participants' questions arising from their reading of the *Operating Manual* and to an explanation of the mechanics of completing the various decision forms. In the second half of the session, the participants made their first decisions, during which time any remaining ambiguities in the mechanics of recording the decisions were clarified by the administrator.

The following chapter outlines the development of each of the simulation exercises in the seven cities and contains an evaluation of each exercise, based partly on the final joint discussion meeting with the participants held shortly after the conclusion of each simulation exercise.

Although it had been hoped to conclude the entire series by the end of December 1961, certain delays encountered during the simulation period required the extension of the sessions to mid-February 1962, so that twelve sets of decisions could be covered in most of the seven exercises. These delays were due, in part, to the relocation of the computation center on The University of Texas campus in October 1961, which resulted in a ten- to fourteen-day lapse in computer availability. Further delays were traceable to occasionally erratic mail deliveries that did not permit as rapid a decision-processing sequence as initially had been planned.

*See the materials contained in the Appendix which clarify the duties of the local project representatives and outline the general plan of the simulation exercise as presented to the participants. These materials were used in initial orientation meetings with these respective groups.

Chapter III

Simulation Exercises in Seven Texas Cities

SIMULATION EXERCISE 1: BEAUMONT

The accompanying charts summarize some of the aspects of the development of the Beaumont exercise. The index of construction activity was a demand parameter and was uniform in all exercises, characterized by a strong seasonal influence and a moderate trend, with little cyclical movement.

The price chart shows the price ranges on offerings of the two products in the local region, Product A being the original product and Product B the improved substitute. Also shown on the price chart are the price movements (administratively determined) of outside competitors. As may be seen in the equations of the demand model, aggregate demand available for the small companies moves inversely to the ratio between small-company and outside competitive price averages. The most noticeable features of the chart are: (1) a monotonic reduction of average prices during the initial five quarters of activity, (2) relatively stable prices during the middle four quarters, and (3) a resumption of the downward movement during the final three quarters. In the discussion following the simulation, it developed that most companies were able to generate immediate cost efficiencies through expanded raw materials' purchases and to operate on diminished profit margins with relatively higher unit-sales volumes, thus preserving, in general, acceptable net earnings. During the middle period, all companies were subject to increased labor costs, and many were committed to expenditures for equipment replacement and new-product introduction. During the final phase, several companies began to exploit scale economies achieved during the middle portion of the exercise, using price competition as their principal competitive weapon. Product B, in general, maintained about a one-dollar price advantage over Product A. As in most of the other exercises, this situation provided an interesting example of what might be termed "precedent pricing." That is, given an initial price relationship between the two prod-

SIMULATION EXERCISE 1: BEAUMONT

<i>Simulation exercise team</i>	<i>Firm</i>	<i>Product</i>	<i>Number of employees in firm</i>	<i>Number of employees participating</i>	<i>Status of employees participating</i>
1	Alco Products, Inc.	Oil-field equipment	500+	4	Middle management
2	International Derrick and Equipment Company	Oil-field equipment	n.a.	4	Top and middle management
3	John Dollinger, Jr., Inc.	Structural steel	50-99	3	Top and middle management
4	Standard Brass and Manufacturing Company	Metal castings	100-249	3	Top and middle management
5	Mabry Foundry	Metal castings	8-24	4	Top and middle management
6	Ramsey-Kantz Company	Structural steel	100-249	5	Top and middle management
7	First National Bank of Beaumont	Banking	n.a.	5	Vice-presidential level
8	School of Business Administration, Lamar State College	Education	n.a.	4	Faculty
9	Gulf Coast Machine and Supply Company	Oil-field equipment	100-249	5	Top and middle management

ucts established by the innovating companies, that relationship tended to be preserved throughout the simulation. For example, one may contrast the price structure in Exercise 1 with that in Exercise 5, where much narrower differentials existed.

The charts showing total unit sales in the local region and the market share for Product A are self-explanatory. The chart relating to the market share for Product B is of some interest. Product B was introduced simultaneously by three companies in the fourth quarter. They were joined in the sixth quarter by a fourth company, in the eighth quarter by a fifth, and in the eleventh quarter by a sixth. Despite the fact that, by the twelfth quarter, Product B was accounting for about 69 percent of total demand and had enjoyed rapid and consistent sales increases for the previous year or so, three companies had still not chosen to market the product (companies 1, 4, and 9). The poor earnings records of these companies were largely attributable to declining total sales of the original product and to the generation of chronic overinventory positions with consequent working-capital shortages.

Access to the North-Central region was permitted during the sixth quarter. Initially, five companies attempted to market products in that region. The demand model for this region is somewhat less stable than for the local region, places greater weight upon nonprice demand factors, and possesses cumulative carry-over effects that reward consistently heavy demand-creating activity. The results are apparent in the two market-share charts for the North-Central region, where an uneasy equilibrium had been reached by the twelfth quarter, with two aggressive companies splitting the market about equally. The other companies, after sustaining heavy losses and being unwilling to commit necessary promotional expenditures, had withdrawn from the region.

The final chart provides a rough summary measure of performance. Companies 1 and 9, in general, suffered from similar problems: (1) shrinking demand because of failure to market the new product, (2) high-cost operations because of reluctance to invest in new equipment, and (3) a steadily deteriorating working-capital position that increasingly deterred necessary expenditures and compounded the problems generated by the policy failures. The most successful performances, which were recorded by Company 5 and Company 8, were ascribable principally to an active information-seeking approach, aggressive exploitation of new opportunities, and careful information-processing activity.

During the course of the exercise, a competitive-bidding procedure was introduced for a long-term, high-volume contract for the finished Product A. All except one of the firms bid at, or slightly below, current average cost. The ex-

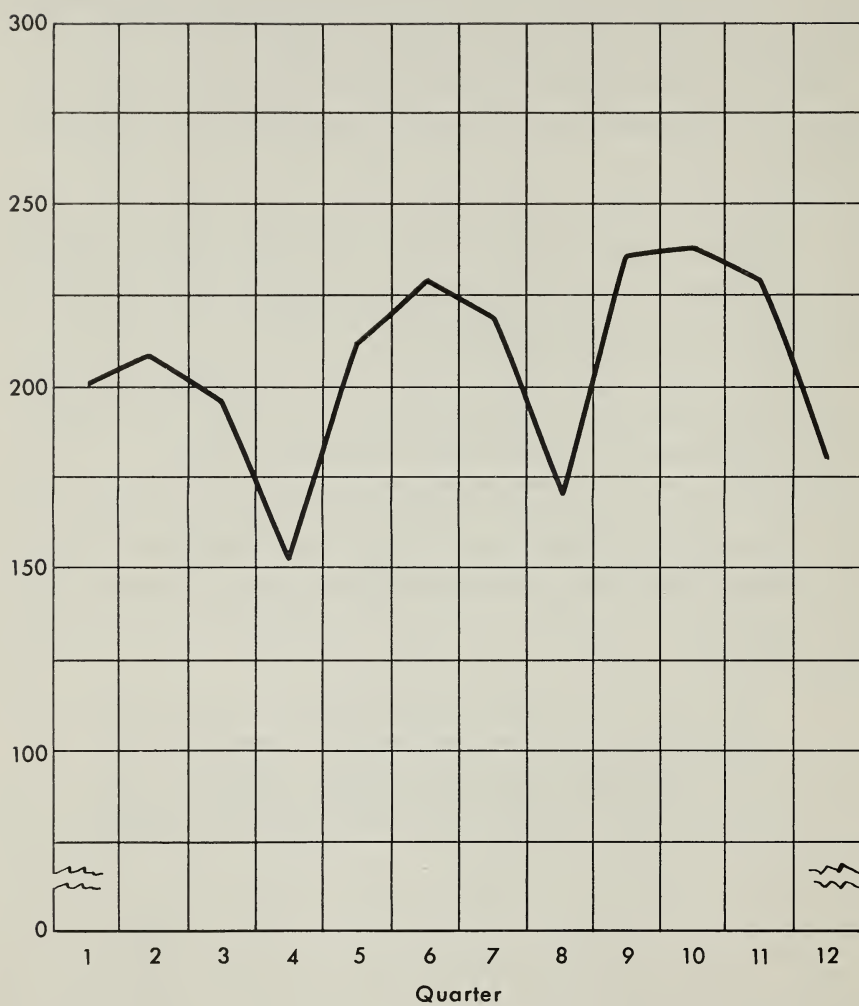
ception (the faculty group), using a marginal pricing scheme, substantially underbid competitors. The net income of Company 8 reflected the profitability of this strategy during quarters seven through ten, and the rationale for this type of pricing became the subject for considerable discussion during the final briefing session. The concept was clearly novel to most of the participants, but its applicability had a demonstrable impact upon them.

During the final evaluation session, the following themes relating to experience in the simulation and recognized as applicable to real activity were developed:

1. Importance of maintaining adequate accounting records, particularly cash-flow analysis in the short run, and of understanding accounting relationships between income-statement and balance-sheet accounts.
2. Importance of inventory control, and particularly its implications with respect to working-capital requirements.
3. Corporate policy regarding debt-equity ratios under conditions of cyclical-demand fluctuations. The banking group, in particular, felt that certain of the firms in the simulation were overextended on debt.
4. General consensus that the simulation was an excellent training device for middle management, particularly as an introduction to the type of data analysis required in controlling the total enterprise. A comment received later from one of the participating groups was representative of the reaction of the majority of the participants in the Beaumont exercise:

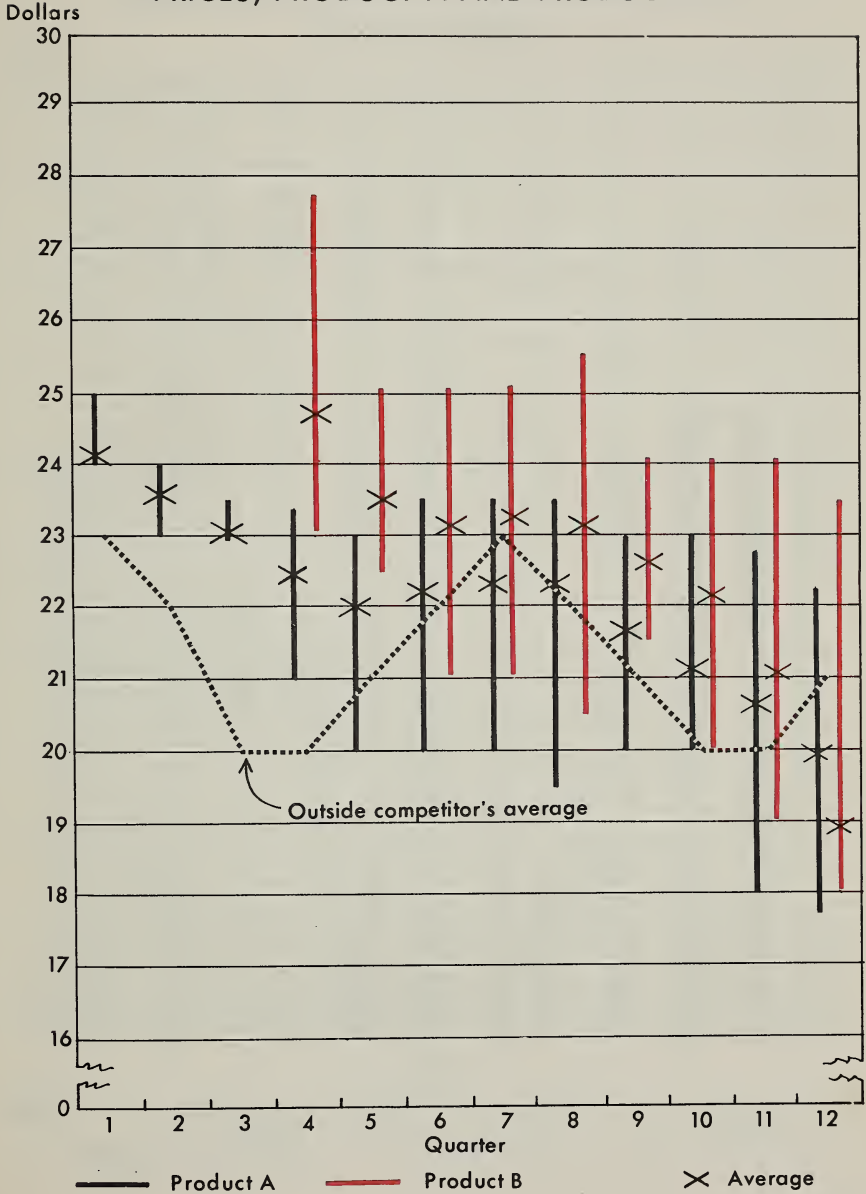
The three of us who made decisions for Company 3 are unanimous in the feeling that this game is an excellent tool for the training of those who will make management decisions. We learned many things during the course of the game, and we were amazed at how closely the game paralleled actual business situations.

INDEX OF CONSTRUCTION ACTIVITY



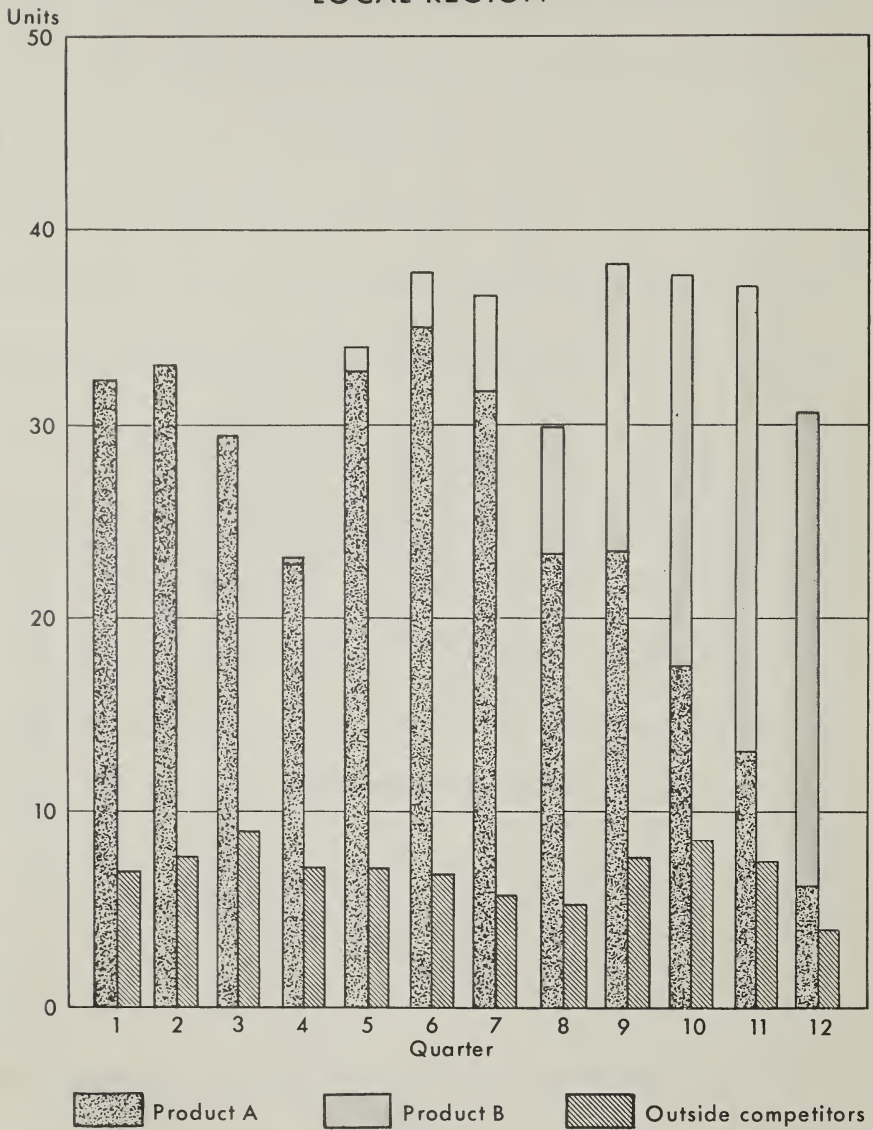
Simulation Exercise 1

PRICES, PRODUCT A AND PRODUCT B



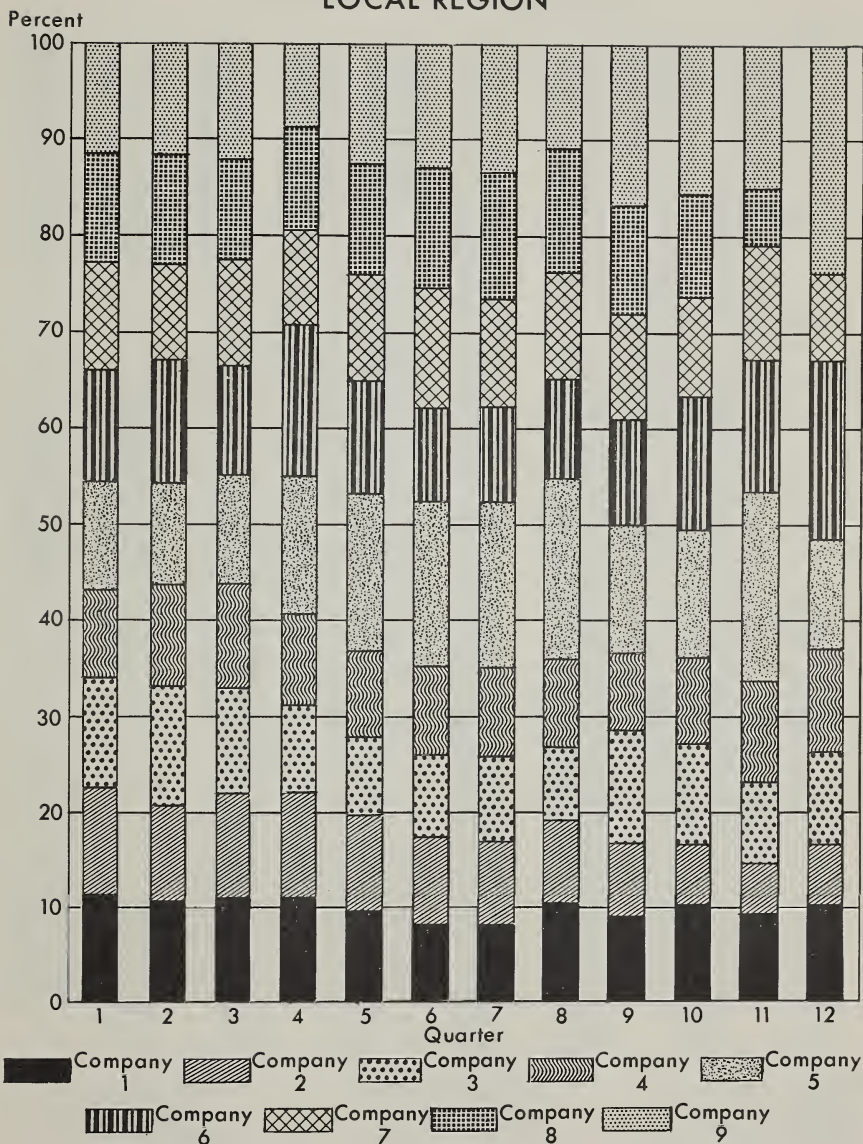
Simulation Exercise 1

TOTAL UNIT SALES BY SMALL COMPANIES, LOCAL REGION



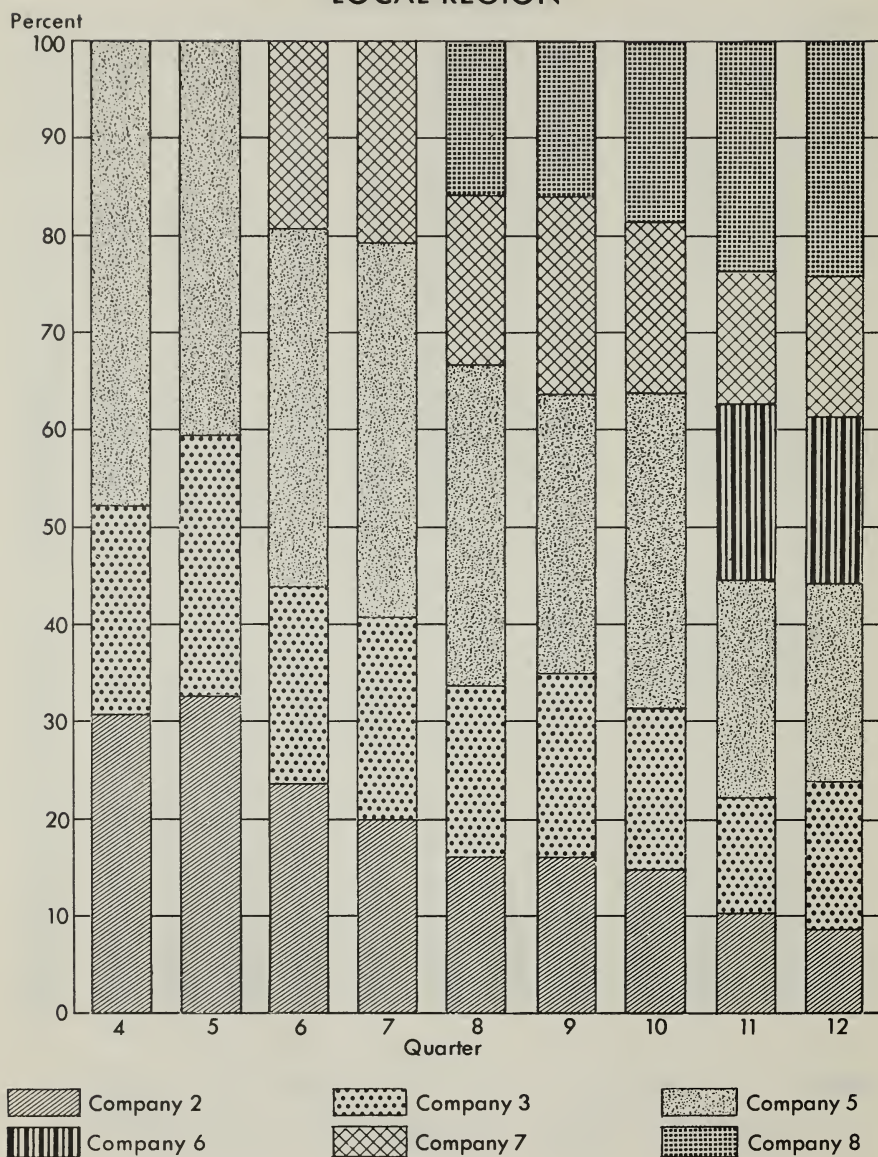
Simulation Exercise 1

MARKET SHARE, PRODUCT A, LOCAL REGION



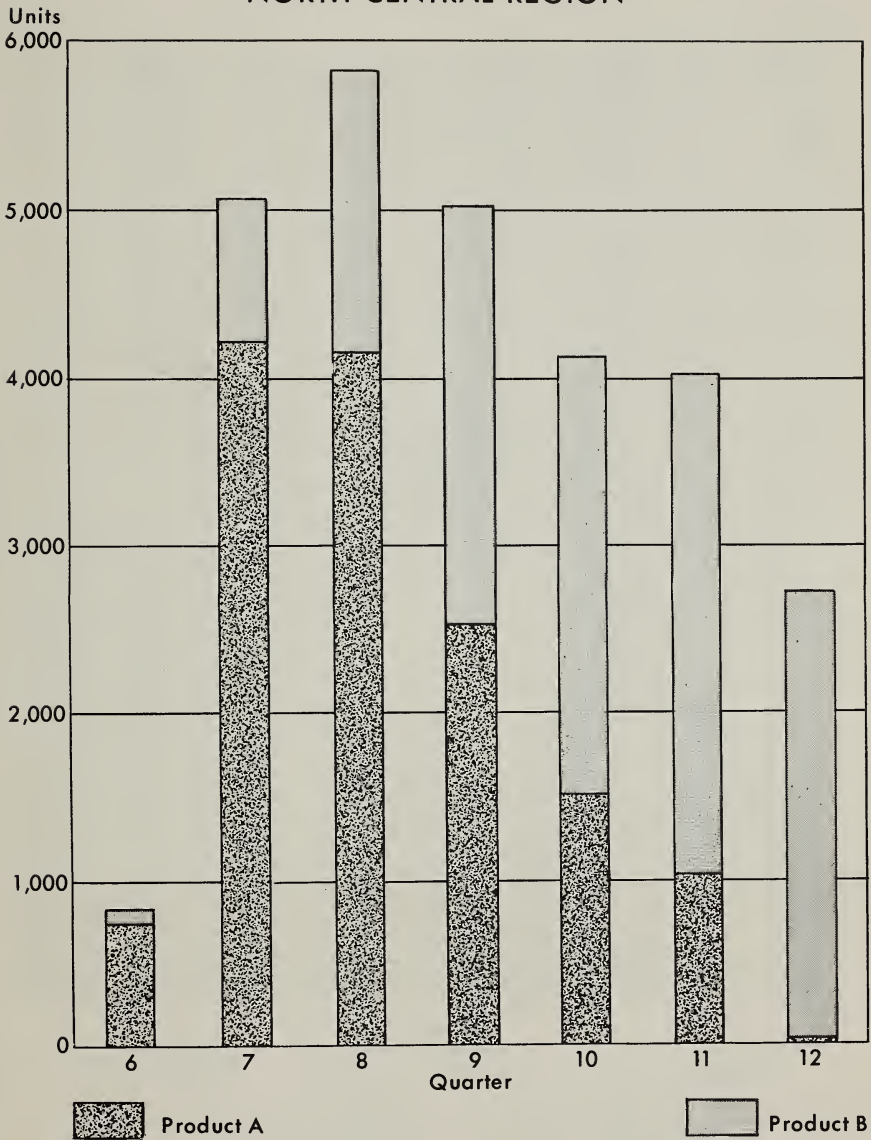
Simulation Exercise 1

MARKET SHARE, PRODUCT B, LOCAL REGION



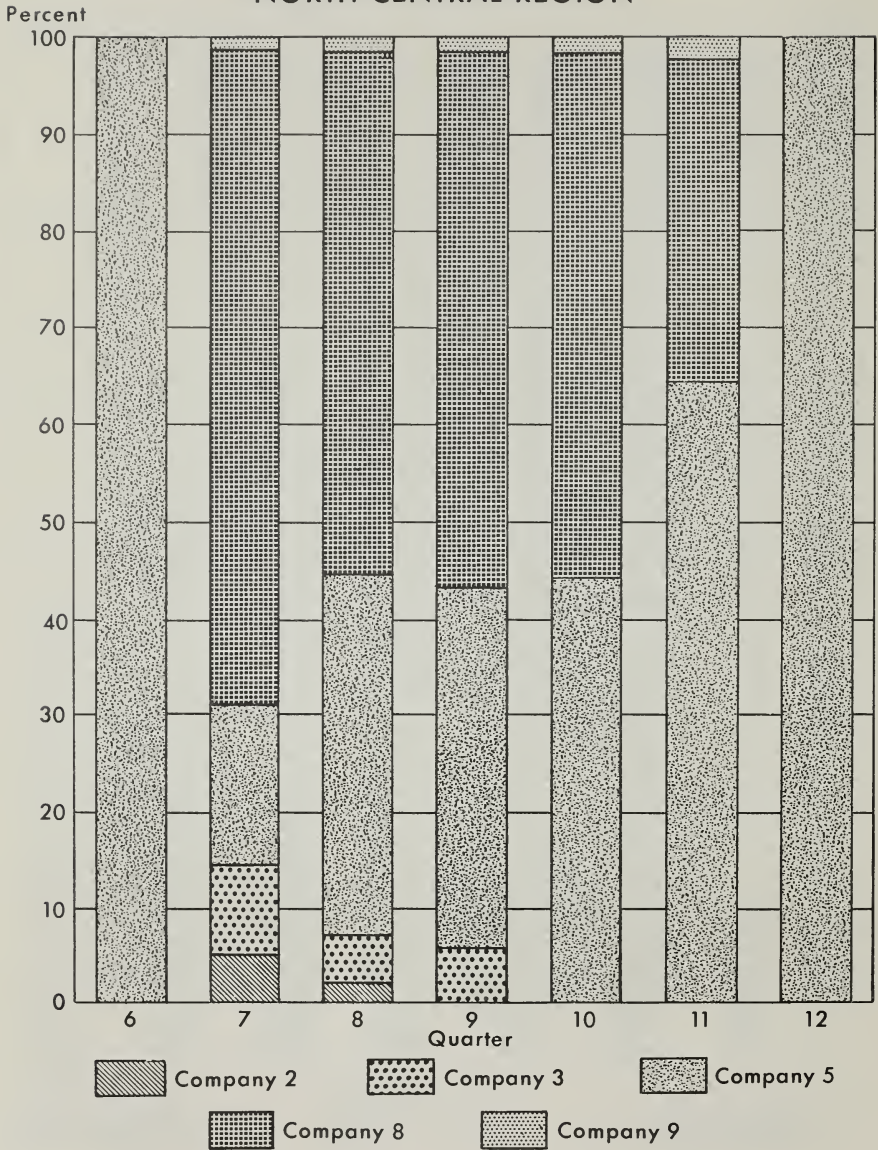
Simulation Exercise 1

TOTAL UNIT SALES BY SMALL COMPANIES, NORTH-CENTRAL REGION



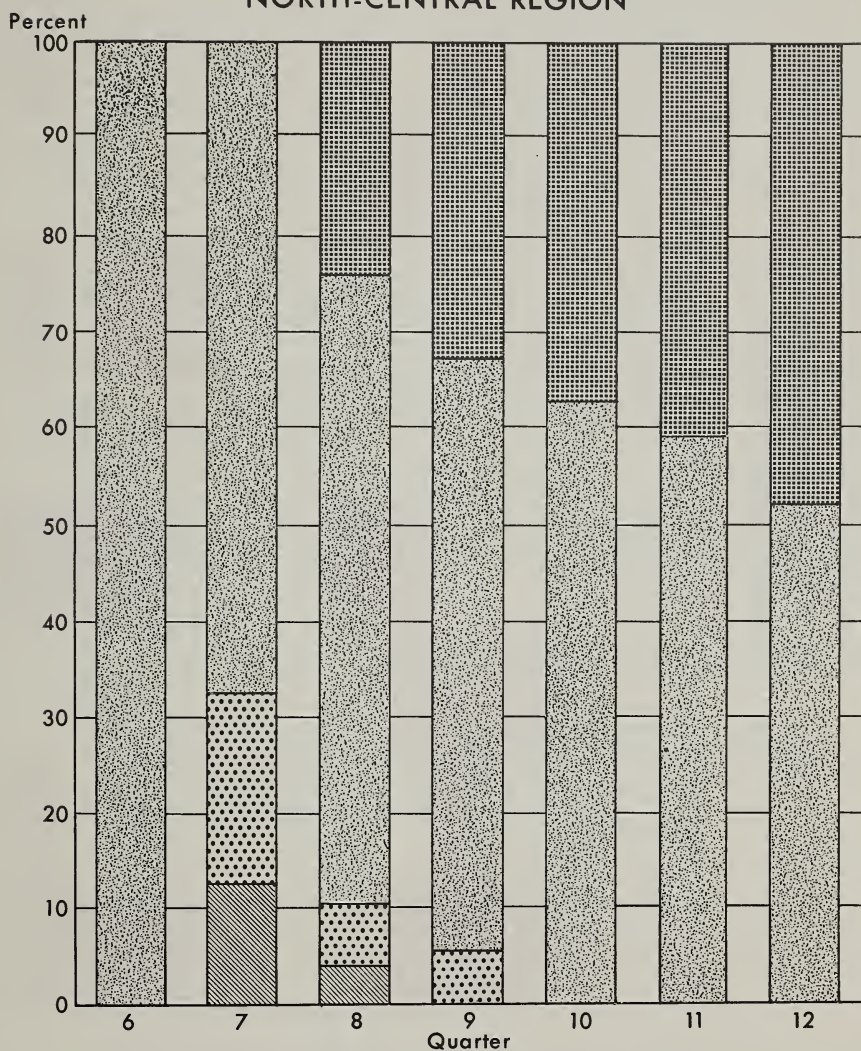
Simulation Exercise 1





MARKET SHARE, PRODUCT A, NORTH-CENTRAL REGION



Simulation Exercise 1

MARKET SHARE, PRODUCT B, NORTH-CENTRAL REGION



 Company 2
  Company 3
  Company 5
  Company 8

Simulation Exercise 1

QUARTERLY NET INCOME

(ROUNDED TO NEAREST DOLLAR)

Quarter	Company								
	1	2	3	4	5	6	7	8	9
1	4,897	5,167	4,677	5,519	5,900	5,382	5,336	3,830	5,103
2	3,433	4,160	3,803	4,704	4,531	2,966	4,831	5,009	5,899
3	- 490	4,693	- 884	2,962	5,624	4,561	2,932	3,757	2,576
4	- 2,580	- 1,210	- 544	52	2,270	2,192	1,334	- 1,656	-10,329
5	- 794	45	- 4,363	- 1,118	8,210	4,994	- 695	5,955	- 9,189
6	1,643	2,462	4,646	- 6	9,629	5,904	4,499	8,900	- 6,695
7	965	4,892	3,366	1,625	11,455	5,035	6,125	5,032	- 2,061
8	- 3,977	3,630	3,811	965	9,645	1,358	4,596	13,129	- 3,596
9	- 6,008	5,571	8,699	251	19,992	-13,364	9,426	17,652	13,345
10	- 8,790	4,759	8,241	- 8,858	15,804	- 8,402	7,924	11,816	-18,494
11	- 8,905	3,170	6,457	- 9,822	3,385	809	4,586	6,573	- 22,883
12	-11,954	- 413	2,327	-14,643	1,527	- 6,520	904	- 4,182	-21,567

SIMULATION EXERCISE 2: DALLAS

An inspection of the accompanying charts would reveal the progress of Exercise 2. The index of construction activity governed total activity in the industry. Its dominant characteristics were a strong seasonal variation plus a noticeable upward trend.

The chart of prices of Product A and Product B shows that all companies were quick to react to the reduction in the price of Product A made by outside competition in the second quarter. Thereafter, all but the highest prices of Product A were below the prices of outside competitors. Since Product B was a new, improved product, it was offered at a higher price.

By its aggressive marketing policies, Company 1 was winning a major share of the market for Product A in the local region at the end of the exercise. The market for Product B in the local region was fairly evenly divided among the six companies engaged in its manufacture when the exercise ended.

It is noticeable that only two companies entered the North-Central region, Company 3 and Company 5. Company 3 had slightly more than half of the market when the exercise ended.

By a reference to the table of quarterly net income, it can be seen that no company was able to avoid loss at all times. Every company had at least one quarter in which it lost money. In the fourth and eighth quarters, seasonal declines in demand caused losses for most companies. Some of the deficiencies in planning that caused losses were:

1. Failure to ask for short- and long-range forecasts of the level of business activity.
2. Inability to estimate from sales data the seasonal pattern of demand.
3. Preoccupation with production problems to the exclusion of planning inventory levels and sales campaigns.
4. Inability to determine costs from manufacturing statements.

The questions which were asked related to such factors as the following:

1. Sources and terms of credit.
2. Possibility of factoring accounts.
3. Price elasticity of demand.
4. Number of units of product resulting from addition of new salesmen.
5. Availability of market surveys.

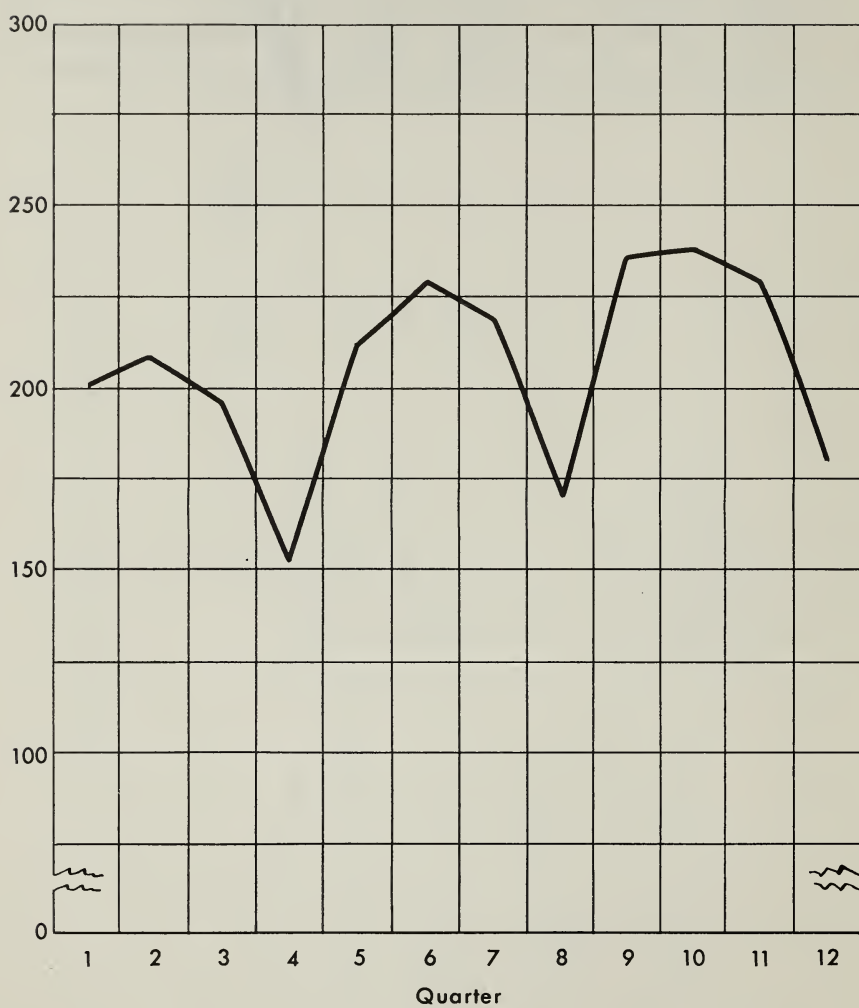
SIMULATION EXERCISE 2: DALLAS

<i>Simulation exercise team</i>	<i>Firm</i>	<i>Product</i>	<i>Number of employees in firm</i>	<i>Number of employees participating</i>	<i>Status of employees participating</i>
1	Lone Star Steel Company	Blast-furnace products, steel pipe, plates, bars	1,000-4,999	3	Middle management
2	Donovan Uniform Company	Men's uniforms	25-49	2	Top and middle management
3	Skinner Brothers Rubber Company	Oil-well molded-rubber goods	25-49	3	Middle management
4	Lone Star Gas Company	Natural gas	250-499	3	Top and middle management
5	Department of Economics, Southern Methodist University	Education	n.a.	4	Faculty
6	E. H. Teasley Company, Inc.	Tents, tarpaulins	8-24	2	Top and middle management
7	Delta Manufacturing and Engineering Corporation	Steam cleaners and generators, refinery cleaning equipment	8-24	4	Top and middle management
8	Sani-Wax Company	Specialty cleaners and polishes	8-24	3	Top and middle management

There was general agreement that the simulation exercise is a valuable training device. Participants who were poor planners came to realize the value of long- and short-range planning. However, all teams had a better appreciation of the need to understand accounting statements.

They would spend many hours discussing a set of decisions, sometimes even working into the early hours of the morning. All expressed gratification at having had an opportunity to participate in the simulation.

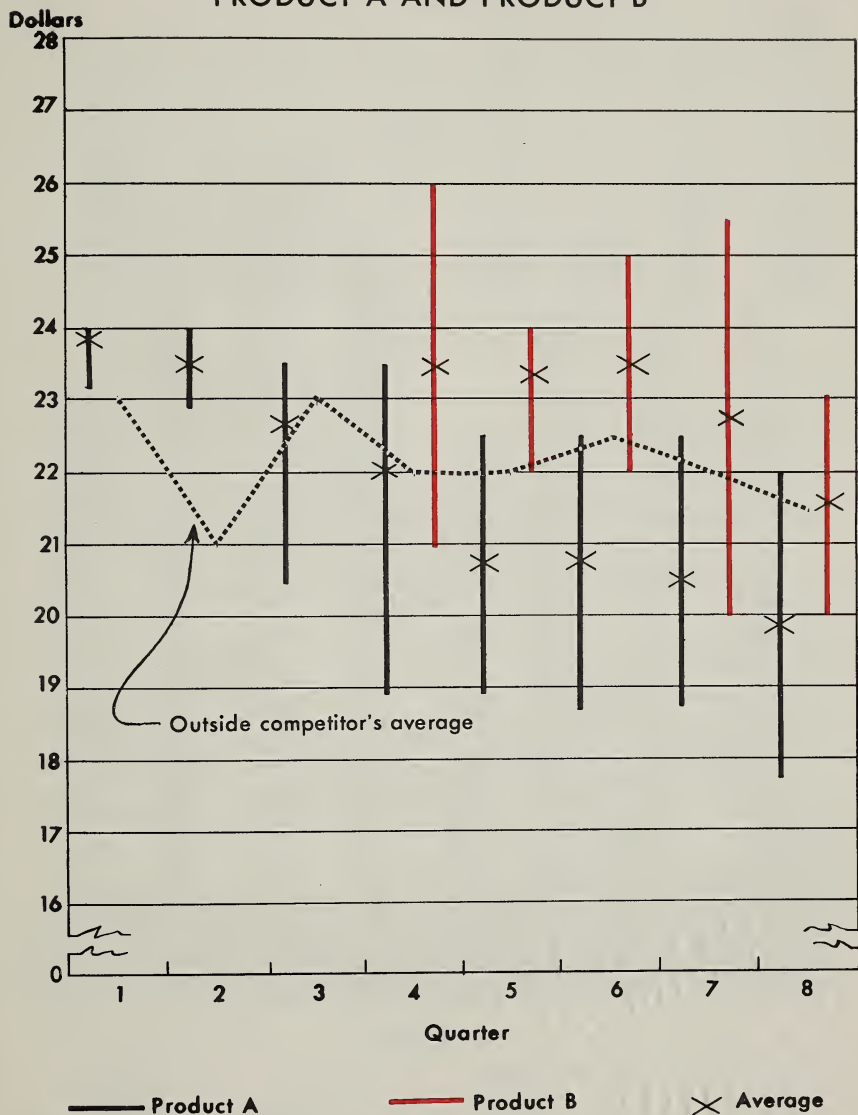
INDEX OF CONSTRUCTION ACTIVITY



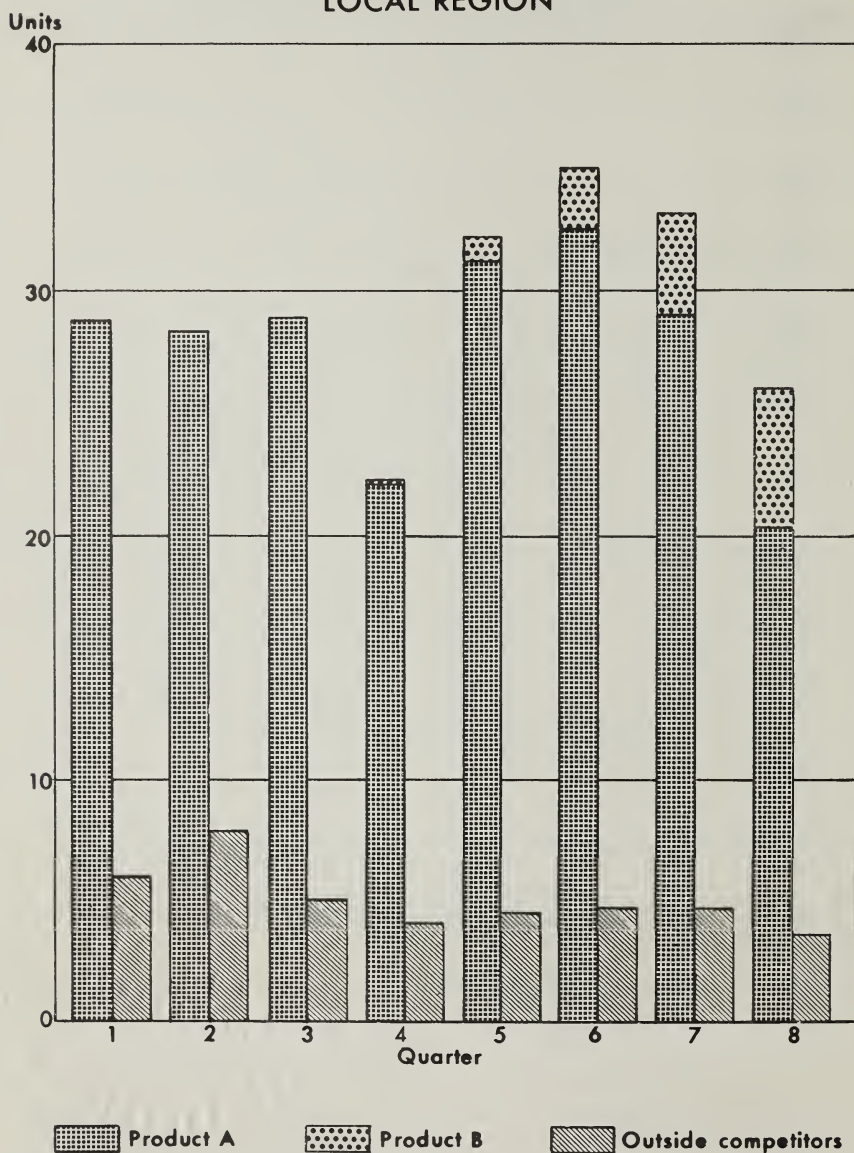
Simulation Exercise 2

PRICES,

PRODUCT A AND PRODUCT B



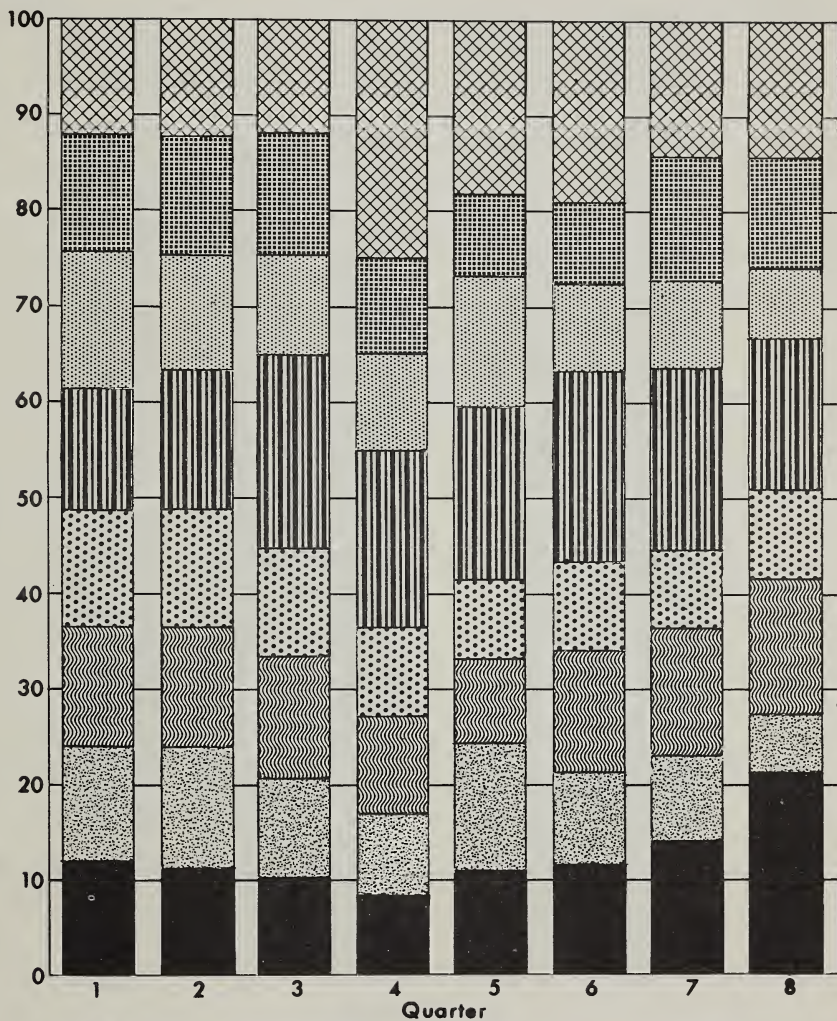
Simulation Exercise 2
TOTAL UNIT SALES BY SMALL COMPANIES,
LOCAL REGION



Simulation Exercise 2

MARKET SHARE, PRODUCT A, LOCAL REGION

Percent



Company 1 Company 2 Company 3 Company 4
 Company 5 Company 6 Company 7 Company 8

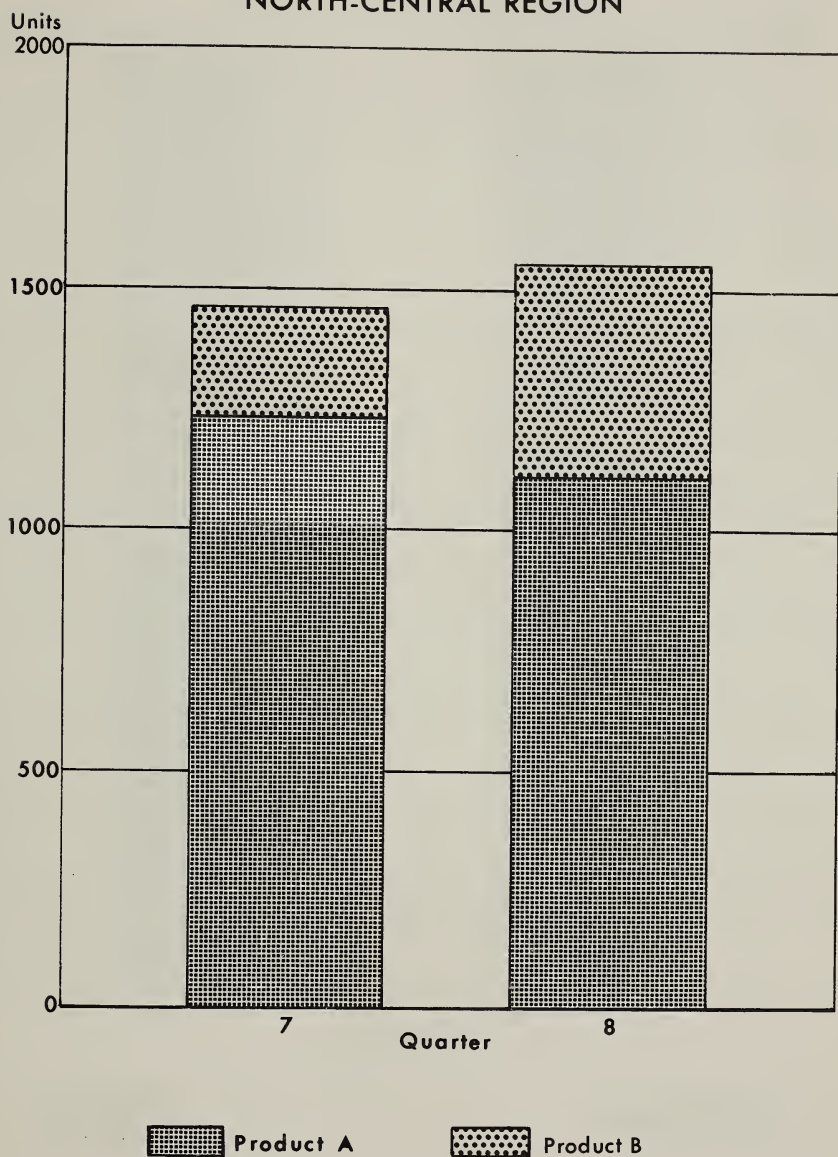
Simulation Exercise 2

MARKET SHARE, PRODUCT B, LOCAL REGION

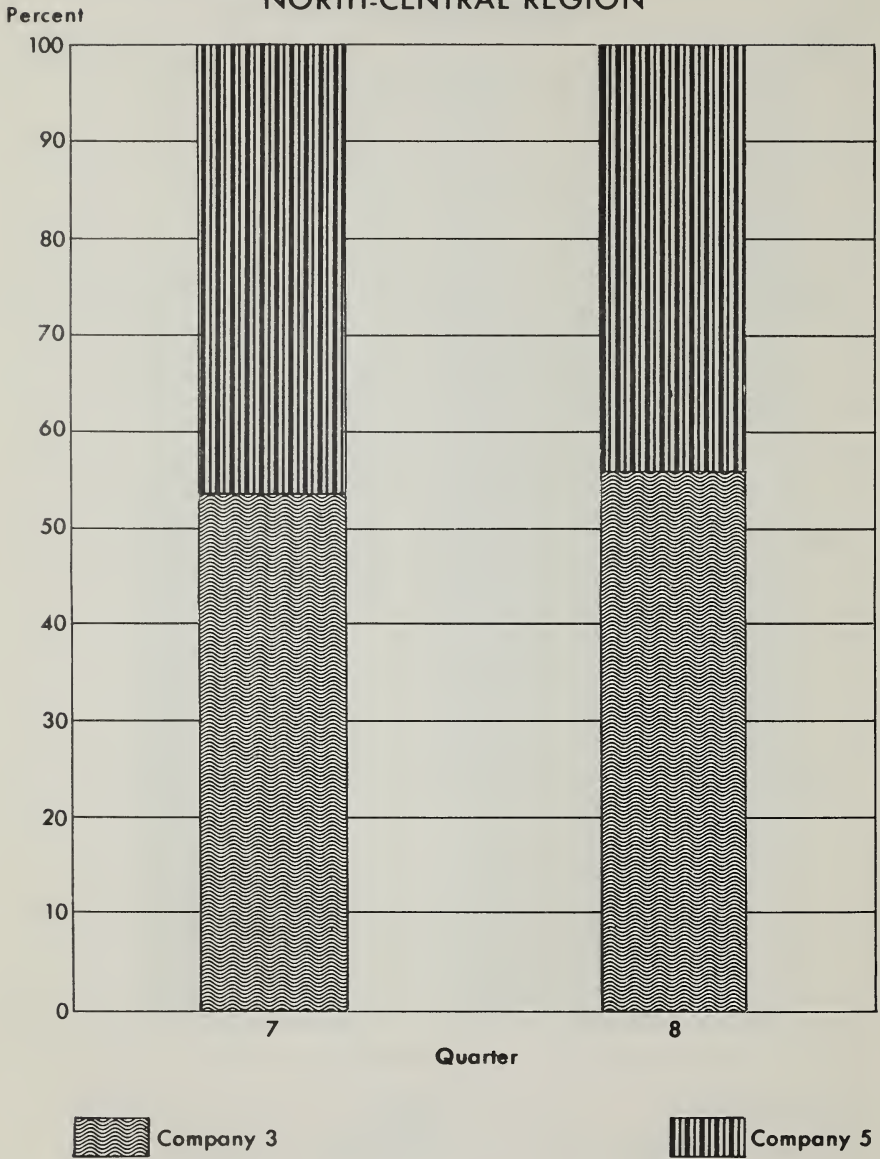


Simulation Exercise 2

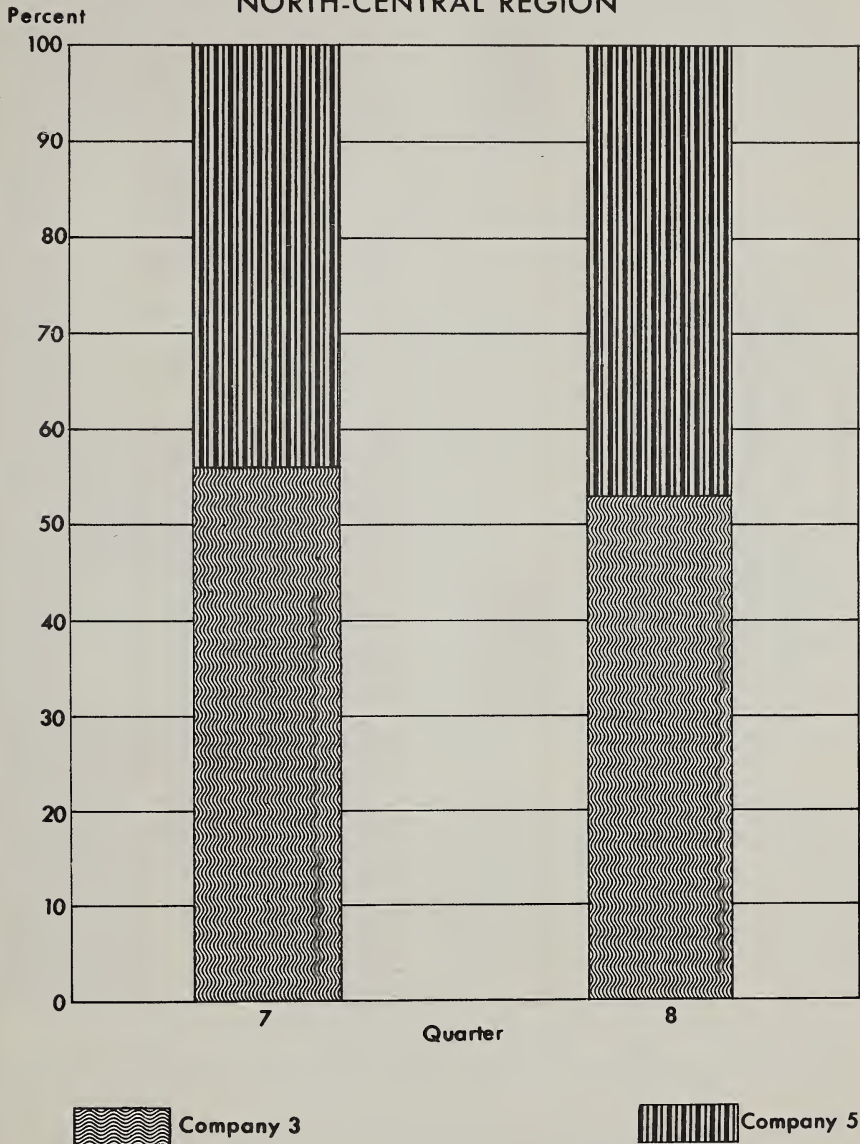
**TOTAL UNIT SALES BY SMALL COMPANIES,
NORTH-CENTRAL REGION**



Simulation Exercise 2
MARKET SHARE, PRODUCT A,
NORTH-CENTRAL REGION



Simulation Exercise 2
MARKET SHARE, PRODUCT B,
NORTH-CENTRAL REGION



Simulation Exercise 2
QUARTERLY NET INCOME
(ROUNDED TO NEAREST DOLLAR)

Quarter	Company							
	1	2	3	4	5	6	7	8
1	4,202	4,789	4,057	4,957	5,463	4,196	4,484	5,209
2	2,174	3,867	-13,781	3,069	2,027	3,548	-15,049	2,650
3	1,755	2,054	1,298	3,822	7,783	2,084	1,371	2,348
4	-1,906	-7,084	-1,881	-1,933	4,273	1,244	-1,887	-1,380
5	1,734	-9,422	-3,303	-3,994	5,928	-3,335	-4,637	217
6	1,085	-812	3,456	-2,057	6,597	-3,059	-2,152	8,322
7	-3,780	-2,090	5,389	-1,169	6,127	763	-7,851	11,441
8	-14,312	-9,992	-2,459	-8,485	-9,016	-1,503	-12,164	4,449

SIMULATION EXERCISE 3: EL PASO

The charts for Exercise 3 begin with one showing prices for Product A and Product B, together with the price charged by the outside competitors. The average price for Product A began to drop early in the exercise and continued to decline until the fifth quarter. The drop can be explained largely by the drop in the outside competitors' price, but it is interesting to note that, after the administrator began to increase the price for outside competitors, the competing companies continued to keep their prices at a low level but did no further price cutting.

The second chart shows the index of construction activity, which was the same as that for the other exercises. Most participants confused the seasonal drop during the third and fourth quarters with the competitive aspects of the simulation, but, by the seventh and eighth quarters, the seasonal aspects of the business were clear to most groups. In the final critique session, the discussion brought out the fact that those participants working in a real business with sharp seasonal patterns recognized the seasonal pattern in the simulation and took it into consideration in their planning much sooner than did those teams who did not deal with this complication in real life.

The table on quarterly net income shows the results of the simulation activity most vividly. All seven companies made money for the first three quarters, but, by the eighth quarter, four were showing losses. An analysis of the causes of the profits made by some companies and the losses made by others showed no clear formula of activity that could have led to success or failure. This is definitely a strong point in the construction of the simulation model. As in a real business situation, it was evident that the end result of company operations depended upon a whole complex of decisions. Even so, some patterns were evident.

A count by the administrator of the number of requests for information which he received from the companies during Exercise 3 showed that companies 1, 2, 3, and 4 asked most often for additional facts to help them make decisions. Three of the four companies named were moneymakers and the fourth, while asking often for information, tended to ask for the same kind of information on almost every occasion and failed to consider the need for help in many areas in which it was not sufficiently informed.

The last three companies asked for little or no information during the simulation and, as a result, did not have the facts they needed for successful operation.

Another partial explanation of the difference between success and failure

SIMULATION EXERCISE 3: EL PASO

<i>Simulation exercise team</i>	<i>Firm</i>	<i>Product</i>	<i>Number of employees in firm</i>	<i>Number of employees participating</i>	<i>Status of employees participating</i>
1	Texas-Arizona Motor Freight, Inc.	Common carrier	50-99	3	Top and middle management
2	El Paso Electric Company	Utility	500+	4	Middle management
3	Hicks-Ponder Company	Manufacturers of western-made work clothing	500-999	6	Top and middle management
4	Texas Western College	Education	n.a.	4	Faculty
5	M and M Fence Company	Construction with rock and steel	8-24	3	Top management
6	El Paso National Bank	Banking	n.a.	3	Top and middle management
7	Laun-Dry Supply Company, Inc.	Wholesale laundry supplies	8-24	4	Top and middle management

among the teams was brought out by a study of the manufacturing equipment used by the competing companies. Companies 1 and 2 purchased two new machines each, while Company 3 bought one new machine and had all of its old machines reconditioned by the end of the fifth quarter. The last four companies made no effort to improve or to add to their machinery as the simulation progressed. As is shown in the chart on market share for Product A in the local region, the companies were dividing the market almost equally among themselves, but the cost of production was substantially higher for that group of companies with old and inefficient machinery. This fact undoubtedly had an important effect on their profits.

With one exception, the companies with the more profitable operation took advantage of contracts for the purchase of raw materials to cut costs further.

The chart indicating the market share for Product B in the local region shows two companies entering the market with Product B during the seventh quarter. The market for this product was shared almost equally. Had time permitted a longer play of this exercise, two other companies were prepared to produce the new product. Inasmuch as the companies began producing Product B late in the exercise, there was no opportunity to involve them in sales in the North-Central region.

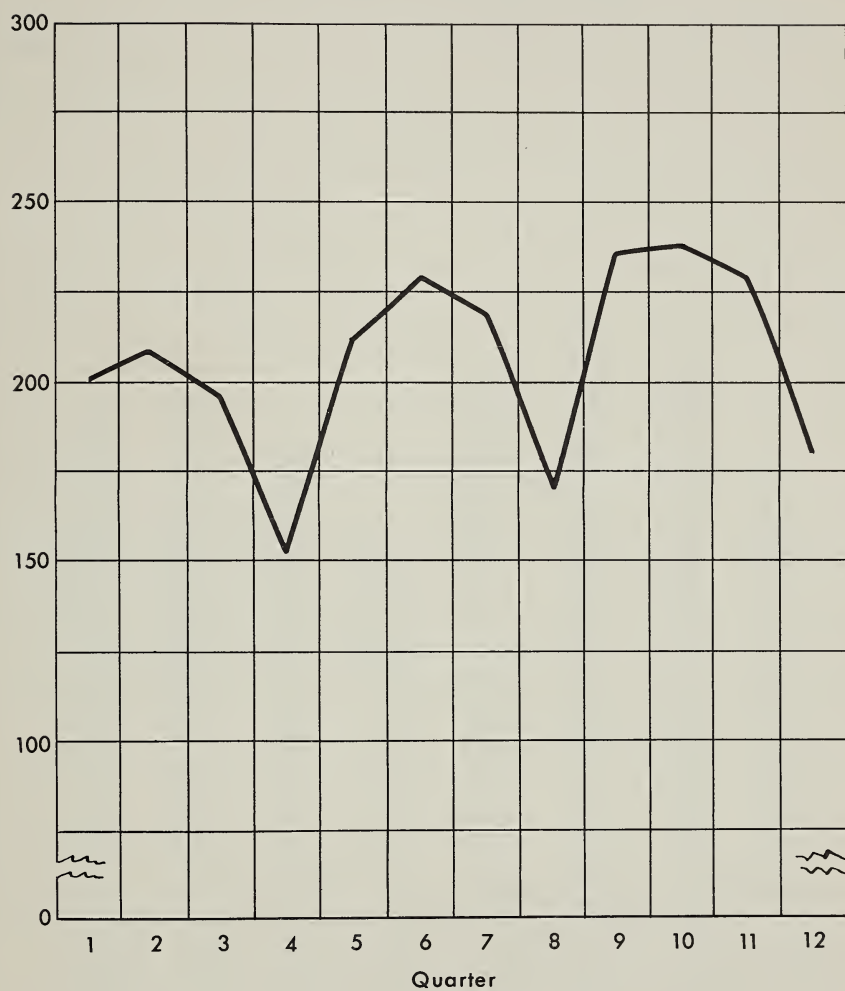
In quarter seven, the companies were asked to bid on the contract for Gigantic Prefab, Inc. Company 4 was the low bidder, but the exercise ended before they were able to realize the profits they could have made on the contract. This company was able to enter the low bid as it had the most efficient plant operation at the time bids were called for. The critique session brought the suggestion that there should have been more opportunities to bid on contracts during the course of the simulation exercise and that the first contracts should have been for a smaller number of units. Two of the companies were afraid to bid on the big contract because they were not sure about exactly what was involved.

Another factor in the profit-and-loss situation that came out in the final critique, and one that fitted in with the factors already discussed, was that, during the early quarters of the exercise, some of the companies became complacent with what they thought was a successful method of operation. These companies failed to look far enough into the future in their planning and were inflexible in their thinking. This lack of proper planning led to high costs on raw materials, shortages of operating capital, high costs of production, and inefficient machinery. Since the studies that went into the development of the simulation pointed out that lack of planning is a common cause of failure among small businesses, the simulation model seems to be quite realistic in this respect.

The El Paso exercise provided an excellent test of the problems of administering the simulation from a distance. The administrator was approximately six hundred miles away from the companies making the decisions. The irregularity of mail delivery and the high cost of long-distance telephone calls presented problems, but they also proved that the simulation could be operated under these conditions. At the final session, however, there was unanimous agreement that there would have been a great deal of benefit derived from having another critique session somewhere near the midpoint of the exercise. Such a session could have been used to clear up doubts held by the participants as to the mechanics of the simulation exercise and to inspire more intensive participation during the second half. Some participants said they felt "lost" being so far away from someone able to answer their questions.

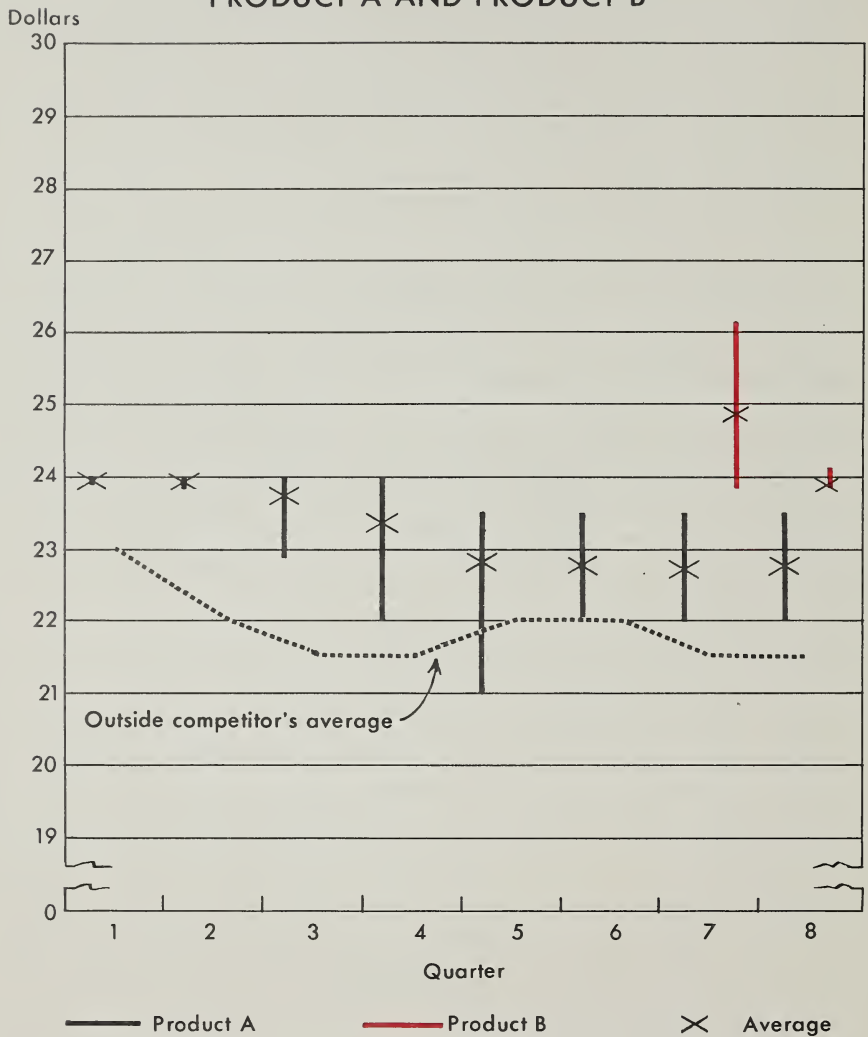
The ability of the simulation exercises to hold the interest of the participants was clearly demonstrated at the final session. The administrator went to El Paso to discuss the simulation results and to get suggestions from the participants for improving the exercise. All of the companies were present at that meeting, and many favorable comments were received concerning not only the learning value of the simulation but also the competitive spirit generated among the participants. Several of those present expressed a desire to continue the exercise for several more quarters so that they would have an opportunity to demonstrate some of the things they had learned from the critique.

INDEX OF CONSTRUCTION ACTIVITY



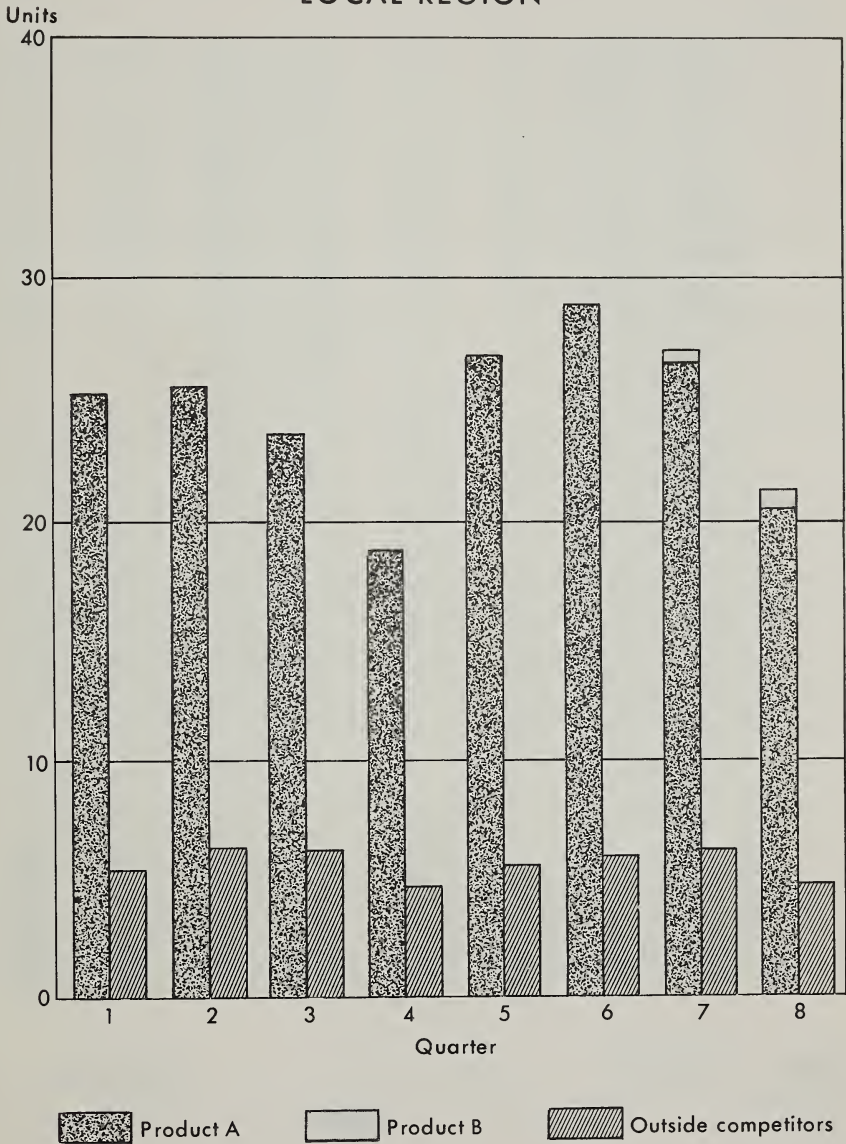
Simulation Exercise 3

PRICES, PRODUCT A AND PRODUCT B



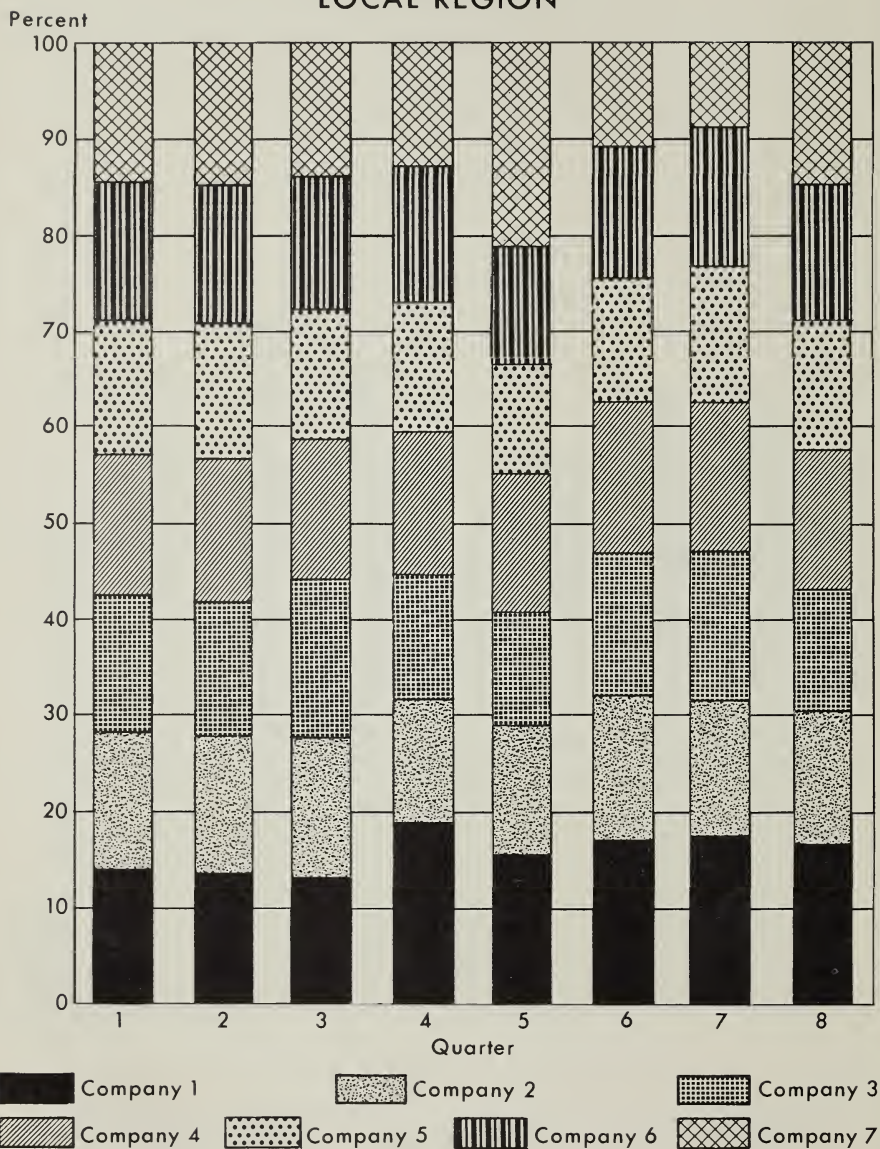
Simulation Exercise 3

TOTAL UNIT SALES BY SMALL COMPANIES, LOCAL REGION

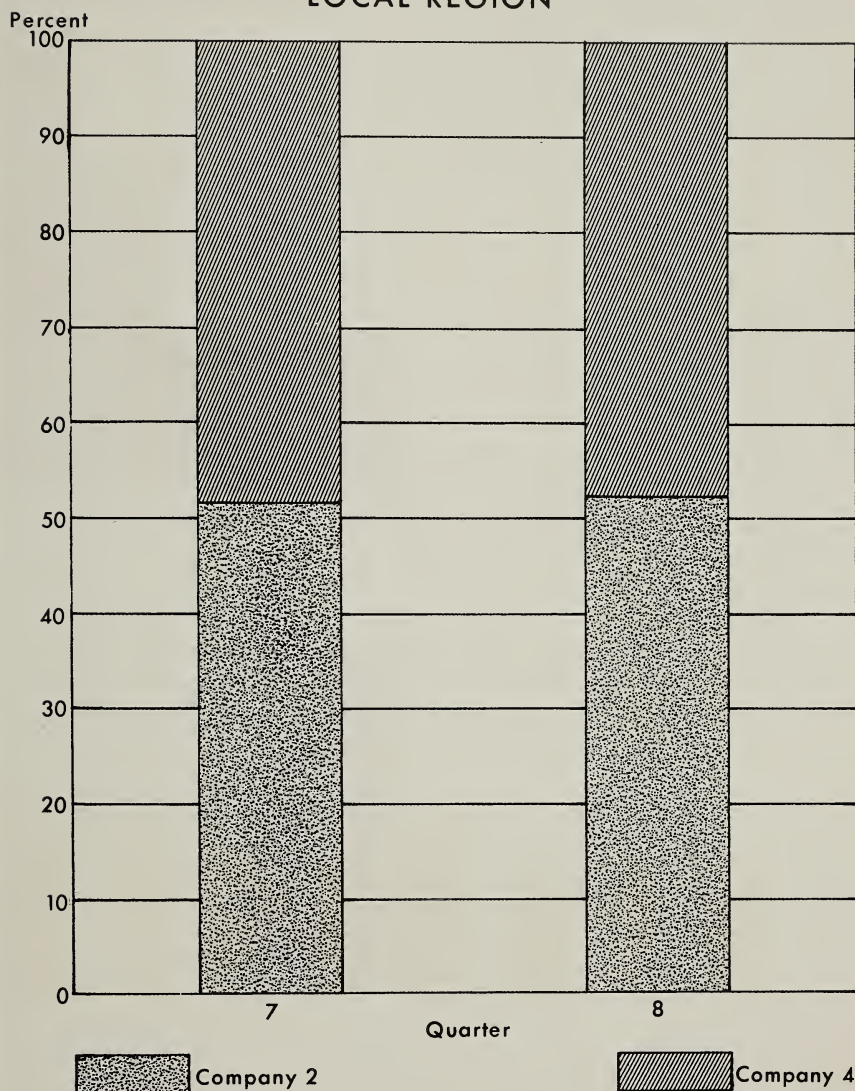


Simulation Exercise 3

MARKET SHARE, PRODUCT A, LOCAL REGION



Simulation Exercise 3
MARKET SHARE, PRODUCT B,
LOCAL REGION



Simulation Exercise 3
QUARTERLY NET INCOME
 (ROUNDED TO NEAREST DOLLAR)

Quarter	Company						
	1	2	3	4	5	6	7
1	4,627	3,794	4,547	4,618	4,894	4,095	4,894
2	4,886	3,581	5,113	4,359	5,352	4,033	3,596
3	3,490	1,126	2,962	3,310	4,988	3,092	1,120
4	- 1,407	- 863	1,486	- 156	2,191	436	813
5	- 29	2,247	5,330	- 154	1,799	195	- 75,499
6	9,080	1,033	5,362	- 10,256	1,008	1,451	- 4,787
7	6,312	1,902	4,668	- 8,842	- 2,819	1,197	- 13,171
8	4,791	1,970	1,170	- 4,078	- 2,438	- 816	- 2,791

SIMULATION EXERCISE 4: FORT WORTH

Exercise 4, conducted in Fort Worth, was composed of six teams with a grand total of thirty individual participants. The various teams represented a wide range of business activity, as is shown in the accompanying table. Participants were engaged in such diverse activities as oil-well servicing, sale of groceries at retail, and the manufacture of pharmaceutical products. There was an attitude of enthusiasm throughout the exercise from start to finish. With only a few exceptions, the members of individual teams were young men. But even the older men had a zest for the occasion that showed a keen desire to learn something new and a willingness to try different approaches to problem solving.

The accompanying charts show the salient features of this exercise. Pricing was very competitive. After the fifth quarter, the local companies' average price for Product A was consistently below that of competitors from outside the region who were offering Product A for sale in the region. After the seventh quarter, Product B was offered at a lower price than Product A, even though Product B was a superior product.

Total unit sales in the local region showed the effect of this competitive-pricing policy. Sales of outside competitors were generally low throughout the simulation exercise. They showed a slight tendency to decline as the exercise progressed from quarter to quarter. The effect of low, competitive prices on the sales of Product B was striking. There was a significantly large increase in the sales of this product from quarter to quarter after its introduction in the fourth quarter. Product B was introduced early in the exercise because of the eagerness of teams to diversify into new products. Beginning immediately after the first quarter, this eagerness was evidenced by persistent inquiries on the form for securing information from the administrator as to the possibility of diversification.

Each company's share of the local market for Product A was the same at the beginning of the exercise. At the end of the sixth quarter, Company 4 had enlarged its share noticeably. By the end of the final quarter, Company 2 and Company 4 had a lion's share of the market split between them. Company 3 had the smallest share. Company 2 was offering Product A at \$19.25 a unit at the end of the final quarter; Company 4, at \$19.50. These low prices boosted their sales materially because Company 3 was charging the relatively high price of \$22.50 at the end of the last quarter.

After the introduction of Product B in the fourth quarter, the number of companies rapidly increased until, by the sixth quarter, all companies were in

SIMULATION EXERCISE 4: FORT WORTH

<i>Simulation exercise team</i>	<i>Firm</i>	<i>Product</i>	<i>Number of employees in firm</i>	<i>Number of employees participating</i>	<i>Status of employees participating</i>
1	The Western Company	Oil-well acidizing	25-49	5	Middle management
2	Lone Star Plastics Company, Inc.	Molded-plastic products	50-99	5	Top and middle management
3	School of Business, Texas Christian University	Education	n.a.	5	Faculty
4	A. L. Davis Food Stores	Groceries	250-499	5	Top and middle management
5	Texas Plastics Materials and Supply Company	Plastics materials	n.a.	5	Middle management
6	Alcon Laboratories, Inc.	Pharmaceutical products	250-499	5	Top and middle management

the market. This rapid adoption of the opportunity to offer a new product was characteristic of the aggressiveness of all companies in this particular exercise.

When the North-Central region was opened up to competition in the ninth quarter, only two companies invaded it. They were followed by two more in the next quarter. Company 1 never entered this region because of a shortage of cash, but it is not clear why the managers of Company 4 did not elect to enter the region, since they were financially able to do so. They were apparently content to prosper on the basis of their substantial share of the market for Product A and Product B in the local market.

A glance at the table of quarterly net income would reveal that Company 2 was the only group that never suffered a loss. Company 4 suffered a loss in only one quarter, the fourth. Their profits were generally good throughout the remaining quarters of the exercise. Company 1 lost heavily during seven of the eleven quarters of the exercise.

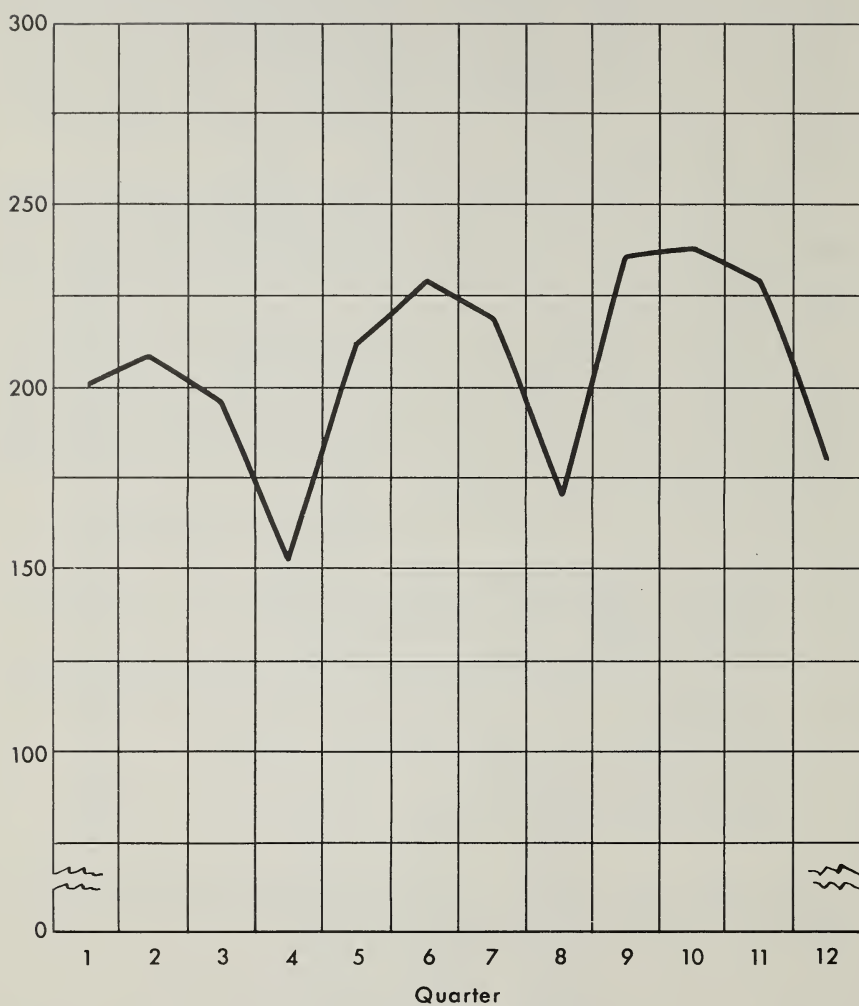
The response of the teams to the challenge of the simulation was gratifying. They identified well with their companies. All were full of competitive spirit, and they were generally eager to diversify into new products and regions. Company 4, the food-store team, played somewhat cautiously but well, finishing the exercise in good financial condition.

During the exercise, the various teams asked questions relating to:

1. New and enlarged lines of credit.
2. Methods of improving performance of salesmen, e.g., by means of a training program.
3. Effectiveness of advertising, e.g., direct mail versus calls by salesmen.
4. Feasibility of closing the plant for one month to reduce inventory (Company 1).
5. Special annual and quarterly forecasts of demand.
6. Market-research information.
7. Engineering survey of the plant.
8. Kinds of new machinery available.

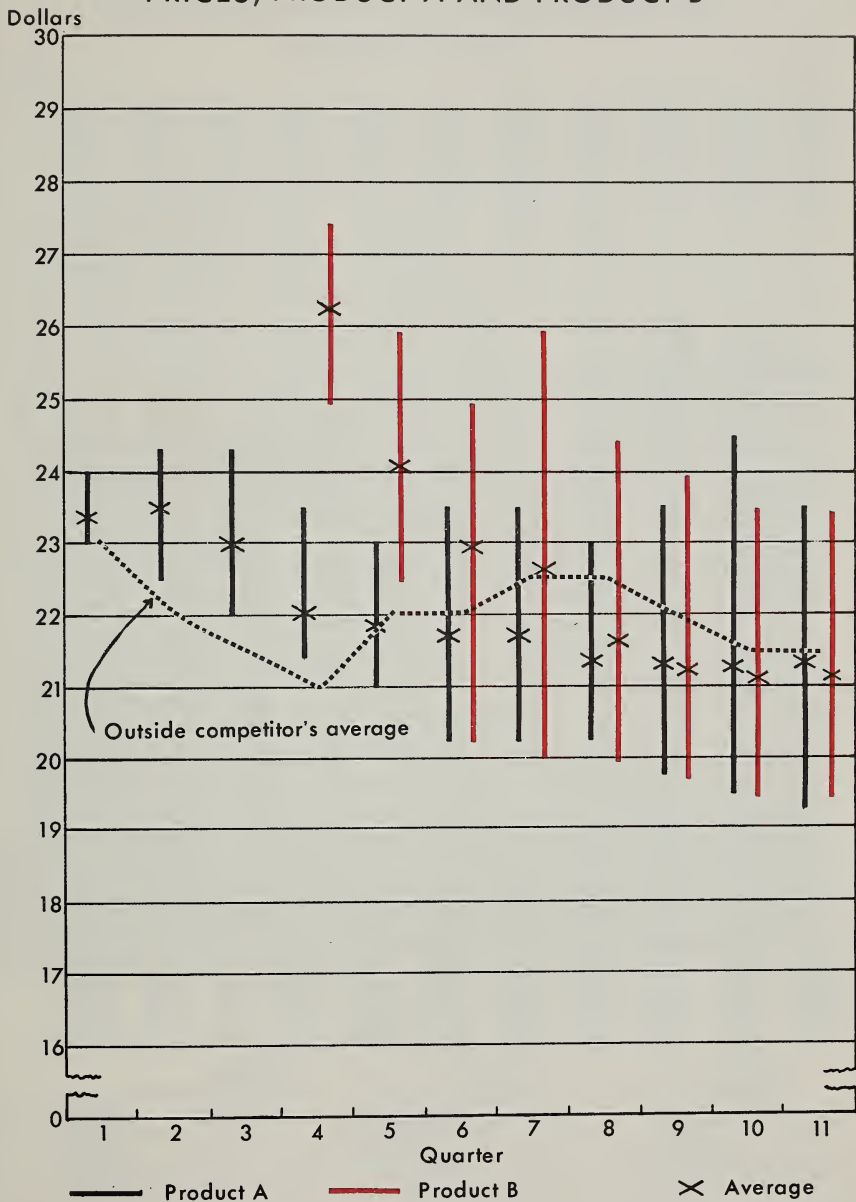
The teams in this exercise were generally quite active and perceptive. All considered the exercise to have good training value.

INDEX OF CONSTRUCTION ACTIVITY



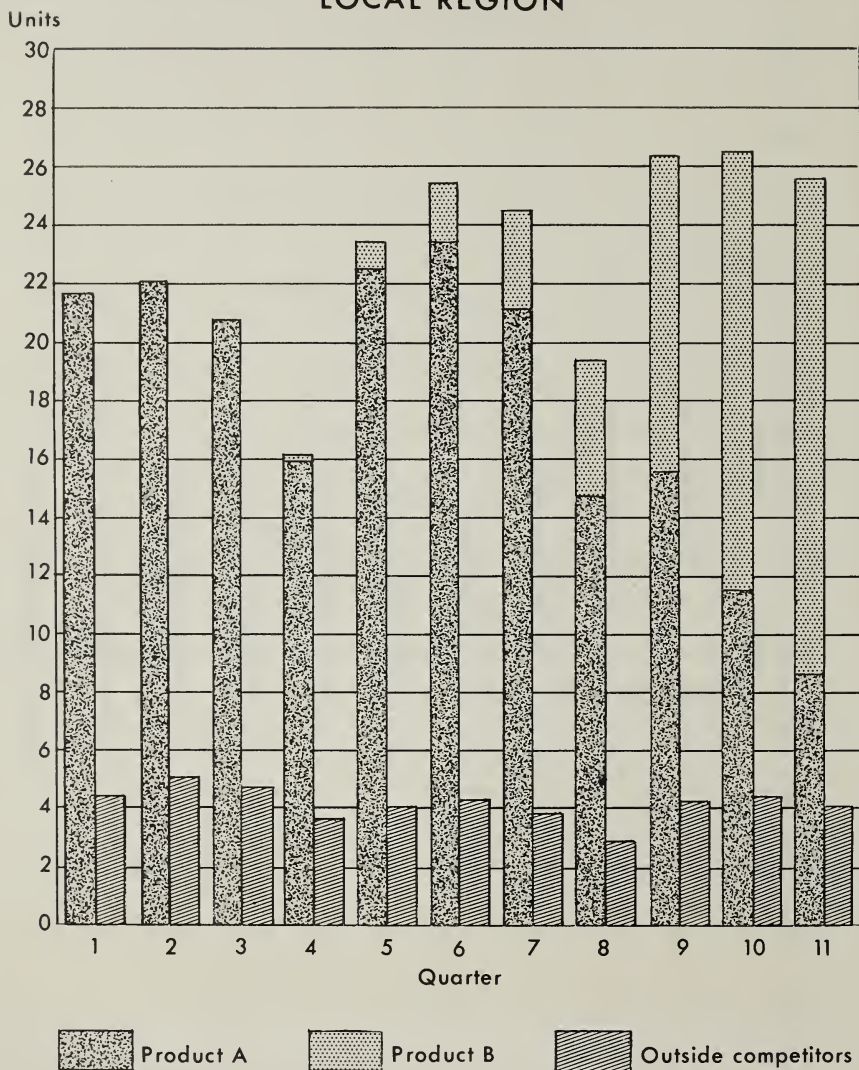
Simulation Exercise 4

PRICES, PRODUCT A AND PRODUCT B



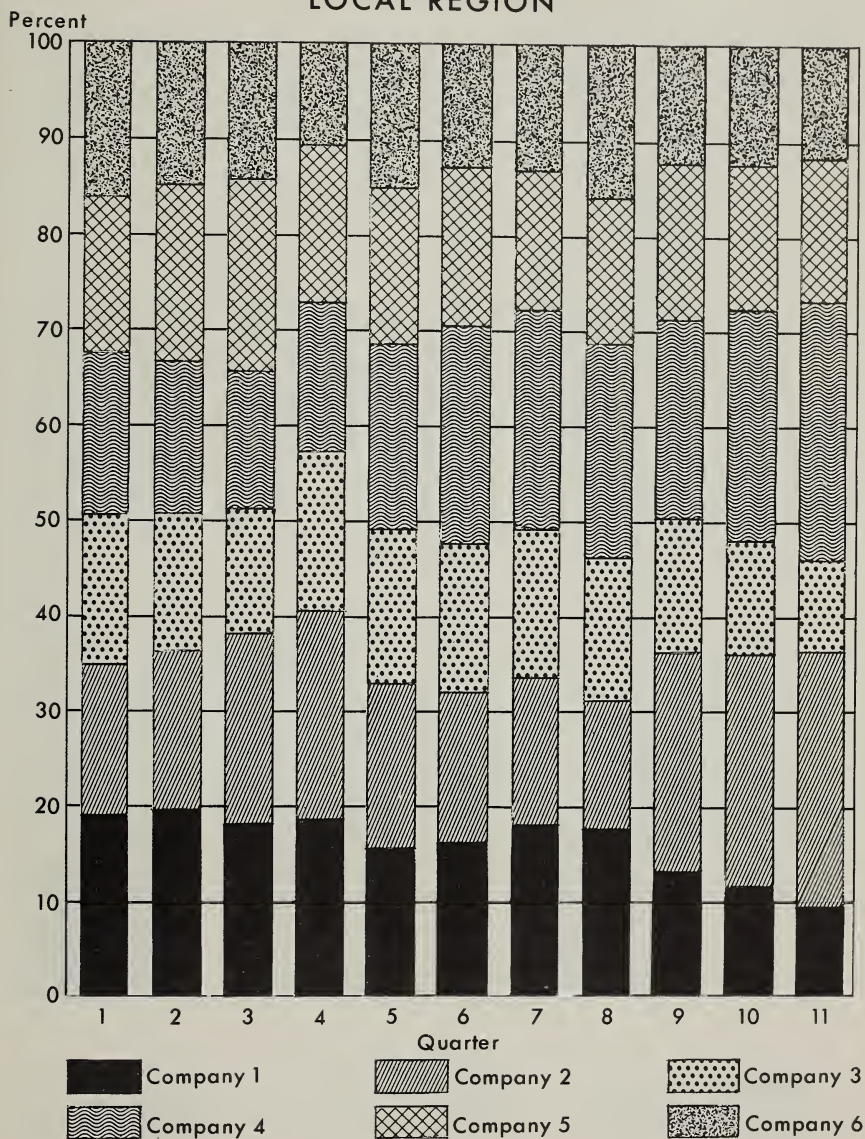
Simulation Exercise 4

TOTAL UNIT SALES BY SMALL COMPANIES, LOCAL REGION



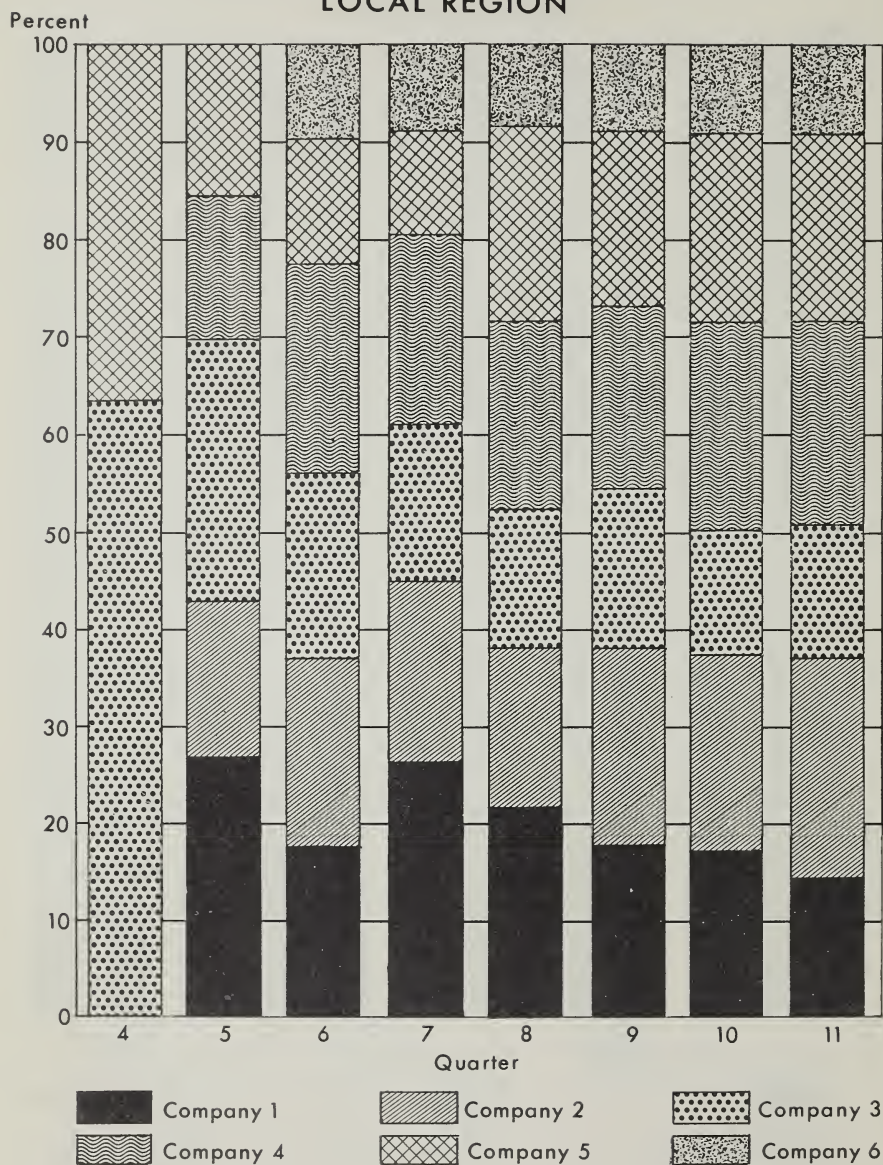
Simulation Exercise 4

MARKET SHARE, PRODUCT A, LOCAL REGION

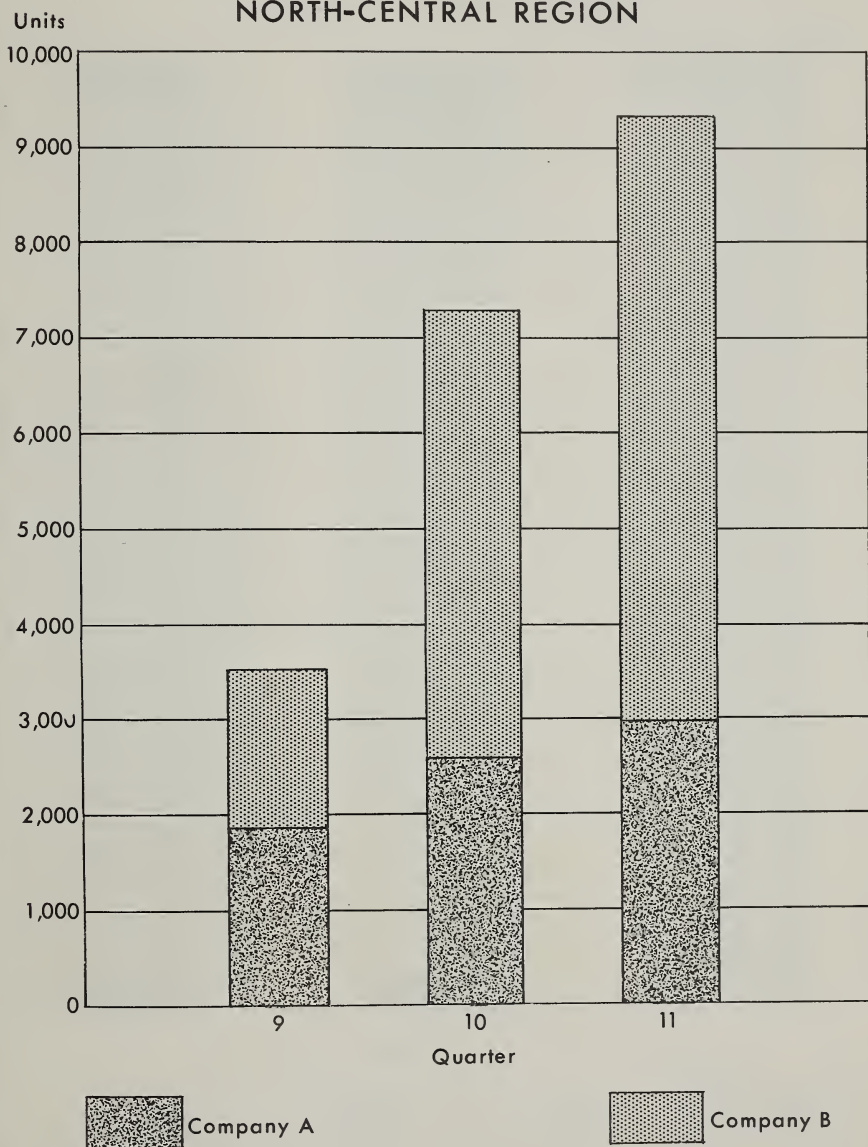


Simulation Exercise 4

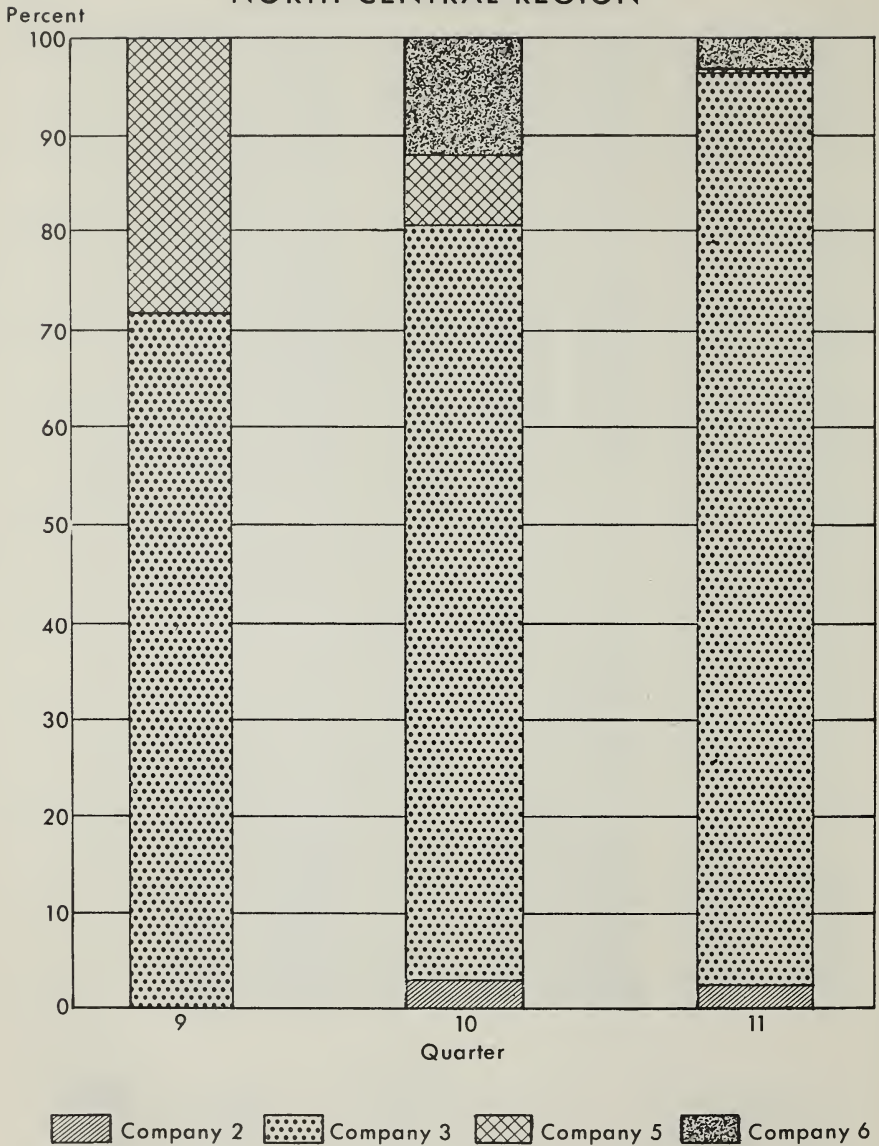
MARKET SHARE, PRODUCT B, LOCAL REGION



Simulation Exercise 4
TOTAL UNIT SALES BY SMALL COMPANIES,
NORTH-CENTRAL REGION

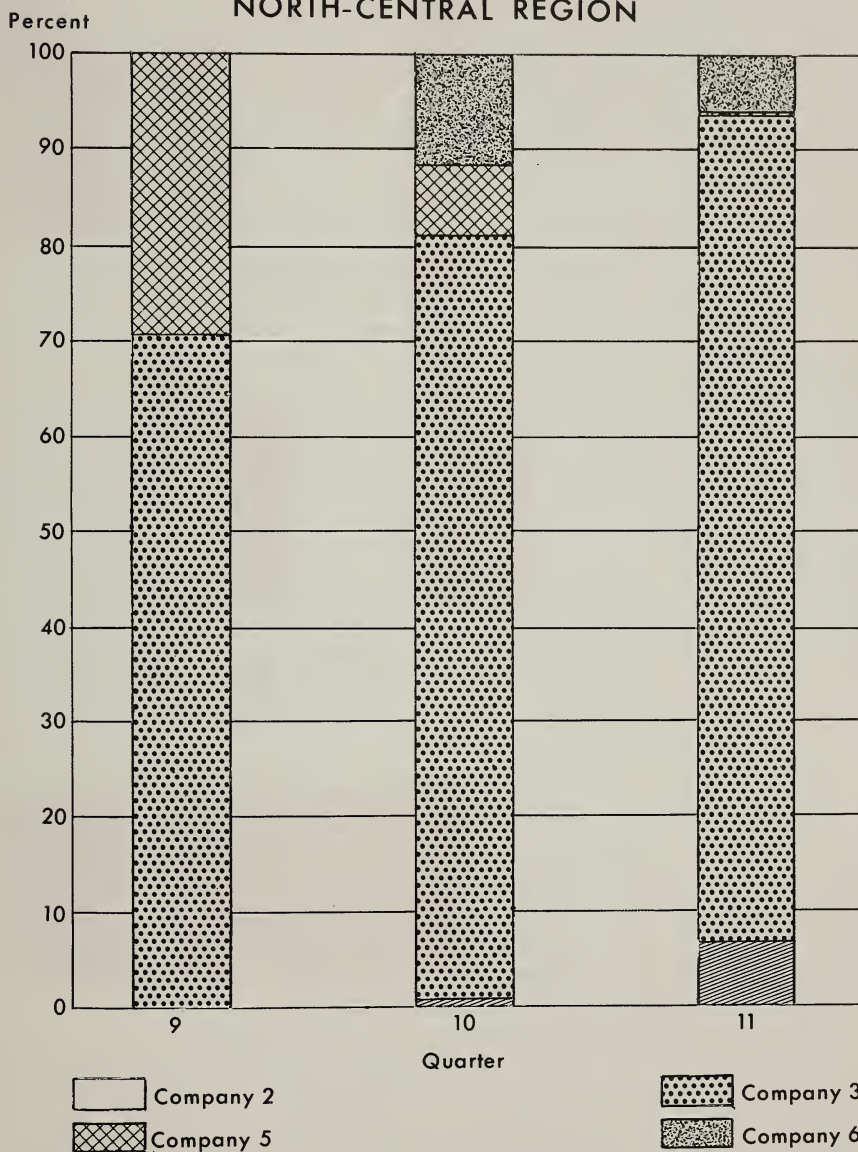


Simulation Exercise 4
MARKET SHARE, PRODUCT A,
NORTH-CENTRAL REGION



Simulation Exercise 4

MARKET SHARE, PRODUCT B, NORTH-CENTRAL REGION



Simulation Exercise 4
QUARTERLY NET INCOME
 (ROUNDED TO NEAREST DOLLAR)

Quarter	Company					
	1	2	3	4	5	6
1	4,663	5,168	4,896	7,340	4,132	4,989
2	4,919	5,931	3,776	3,726	2,093	4,714
3	7,410	3,962	- 3,423	690	4,894	2,638
4	- 8,854	435	- 5,472	- 6,448	- 7,591	- 4,798
5	- 3,646	2,445	1,259	3,116	3,270	489
6	- 4,892	5,750	1,046	5,881	1,545	2,586
7	- 1,201	5,729	- 414	5,922	4,399	4,962
8	- 2,952	1,969	2,715	3,356	- 5,600	5,213
9	1,005	7,871	1,696	6,959	540	7,183
10	- 7,742	6,850	5,328	5,349	- 1,181	6,952
11	- 8,329	4,635	18,613	6,844	- 1,011	- 2,635

SIMULATION EXERCISE 5: HOUSTON

Exercise 5 was characterized by aggressive price and nonprice competition. By the twelfth quarter, this exercise possessed many of the characteristics of an industry subject to chronic overcapacity, with participant companies locked into unsuccessful attempts to capture large market shares through excessive promotional effort. The consequences of such a competitive situation in a market in which the promotional elasticity of aggregate demand is low and in which the number of competitors is quite limited is evident in the profit performances of the companies, which is shown in the chart on net income.

Exercise 5 early developed the symptoms that were to characterize its entire history. Most of the participant companies embarked on a substantial plant expansion during the first year. Product B was developed during the very early phases. By the seventh quarter, when the new product began to account for an increasingly substantial portion of aggregate demand, all companies were marketing it. Similarly, between the fifth and ninth quarters, most companies attempted to operate in the North-Central region. Until the end of the eighth quarter, however, although certain companies had experienced losses, a combination of rising aggregate demand and temporary price stability had enabled the majority of the industry to accumulate reasonable earnings records. But, during the last four quarters of the exercise, the underlying instabilities inherent in the situation combined to drag all companies down. Prices of both products were depressed. All types of promotional expenditures were increased since all companies were by now committed to high-volume output and thus were subject to high fixed costs and unacceptable inventory accumulation.

In general, the Houston exercise provided a painful illustration of the dangers of unplanned expansion; of failure to analyze correctly the consequences of environmental competitive developments and to adjust corporate strategy accordingly; and of failure, in most cases, to undertake short-range forecasting of the effects of corporate tactical decisions. Thus, Company 1, which entered the Product B market aggressively in the sixth quarter without adequate prior information about the market, seriously underestimated demand and was forced into high-cost subcontracting operations to meet its sales demand. This, in turn, threw the company into a serious overdraft situation on current cash commitments from which it never really recovered. In fact, Company 1 consistently suffered from an imbalance between demand and production of Product B between the seventh and ninth quarters.

Other examples of nonoptimal activity particularly noticeable in this exercise were found in the excessive promotional expenditures made by several com-

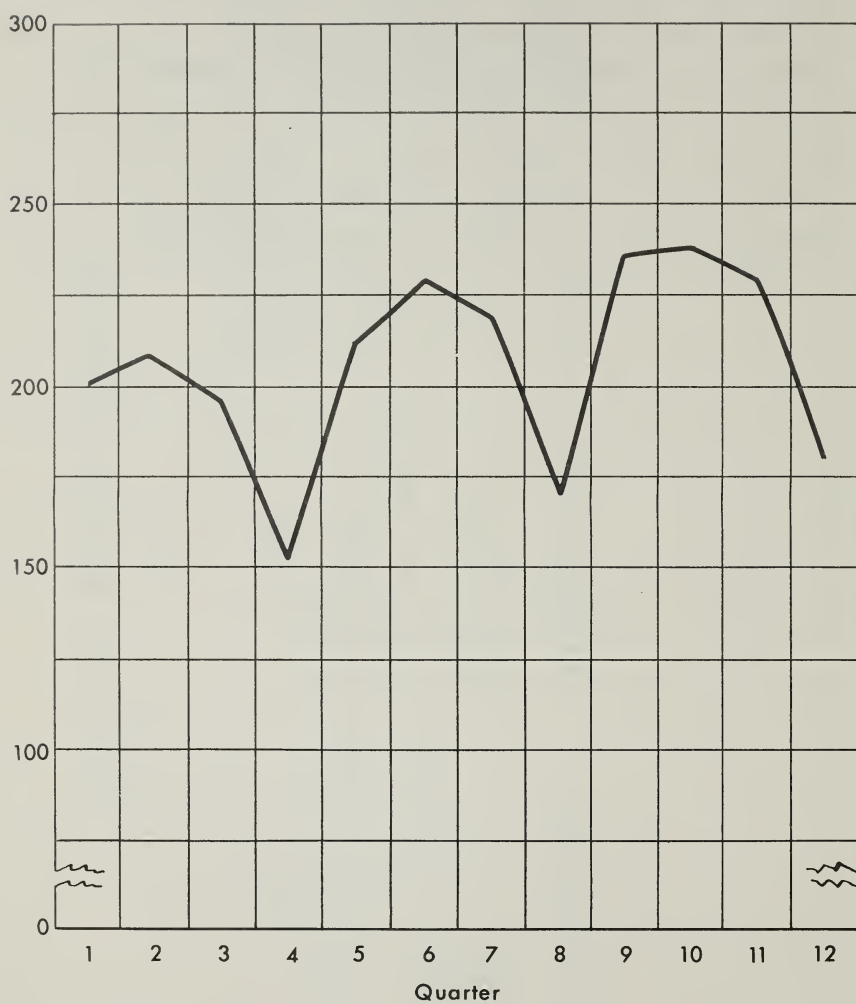
SIMULATION EXERCISE 5: HOUSTON

<i>Simulation exercise team</i>	<i>Firm</i>	<i>Product</i>	<i>Number of employees in firm</i>	<i>Number of employees participating</i>	<i>Status of employees participating</i>
1	C & I Life Insurance Company	Insurance	n.a.	3	Middle management
2	Kelly Manufacturing Company	Metal stampings	100-249	5	Top and middle management
3	Phil Rich Fan Manufacturing Company	Window and exhaust fans	50-99	3	Top and middle management
4	Weatherford Oil Tool Company	Oil-field equipment	25-49	5	Middle management
5	Schill Steel Company	Metal products	n.a.	5	Top and middle management
6	Atlas Bradford Company	Steel castings and pipe	100-249	4	Top management
7	University of Houston	Education	n.a.	5	Faculty

panies, notably by Company 3 and Company 4 in the North-Central region during the last two quarters, and by Company 6 in the local region during the middle phase. In each case, lack of control over these expenditures resulted in unprofitable operations.

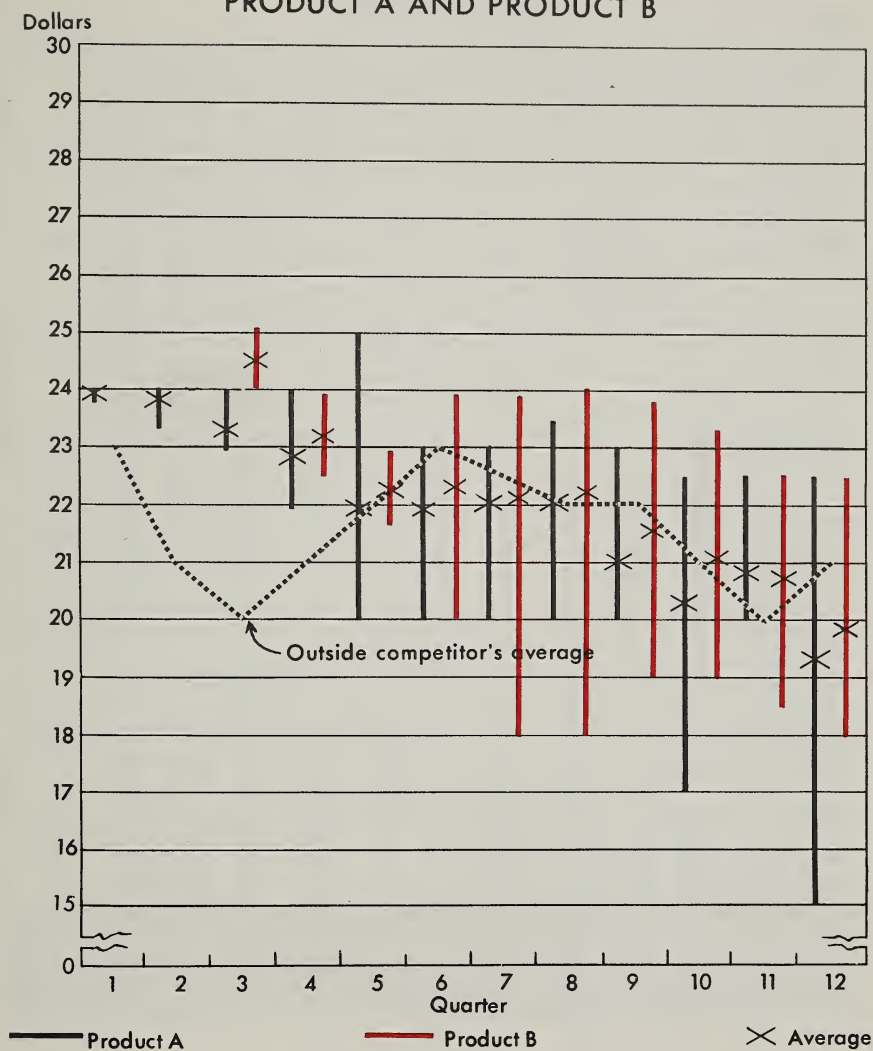
Exercise 5 presented an interesting case simulation of an industry proceeding through an expansionary phase to a state of chronic overcapacity. Most of the participants in this group, in addition to remarking on the value of the decision exercise as a vehicle for practicing with the tools of managerial evaluation, were concerned with the practical implications of the general outcome of the simulation situation. In particular, they remarked on the necessity for carefully planning the strategy of an enterprise in terms both of the objective features of its competitive environment and of the parallel strategies of its competitors.

INDEX OF CONSTRUCTION ACTIVITY



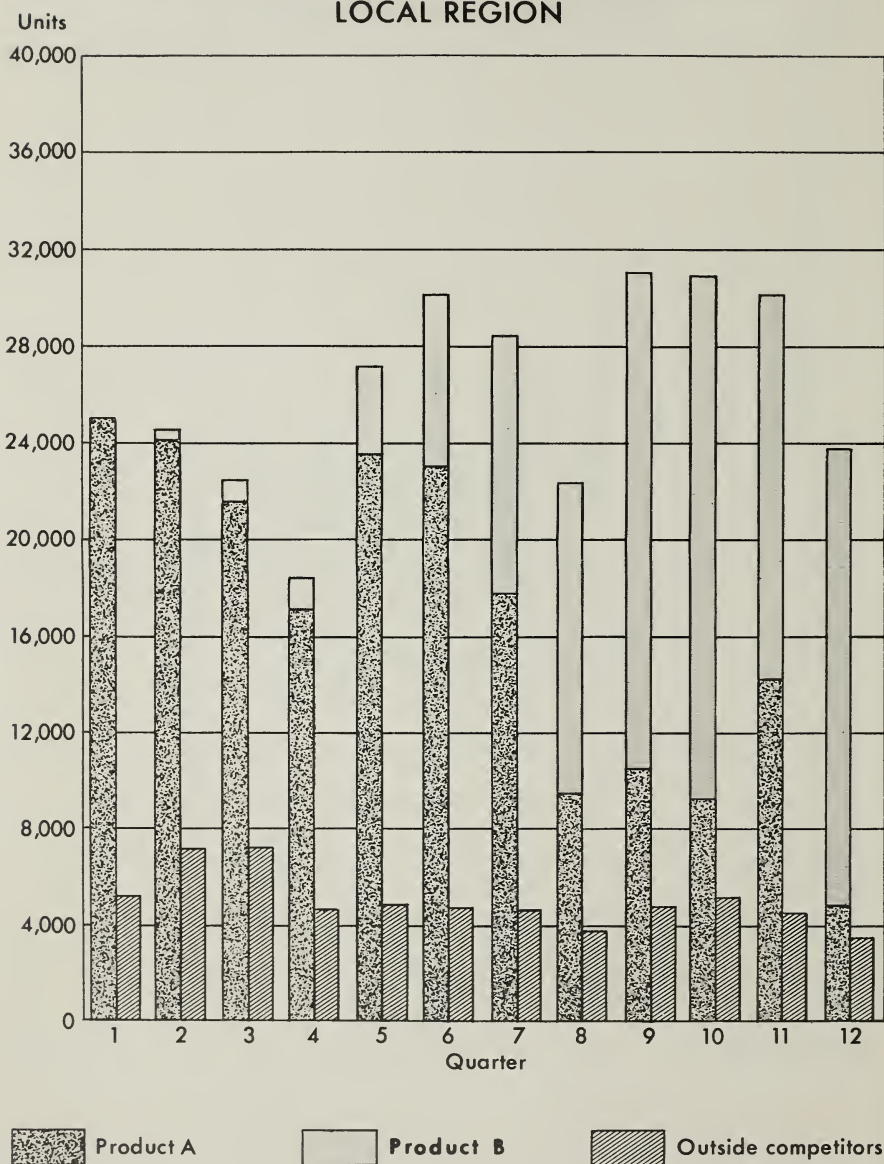
Simulation Exercise 5

PRICES, PRODUCT A AND PRODUCT B



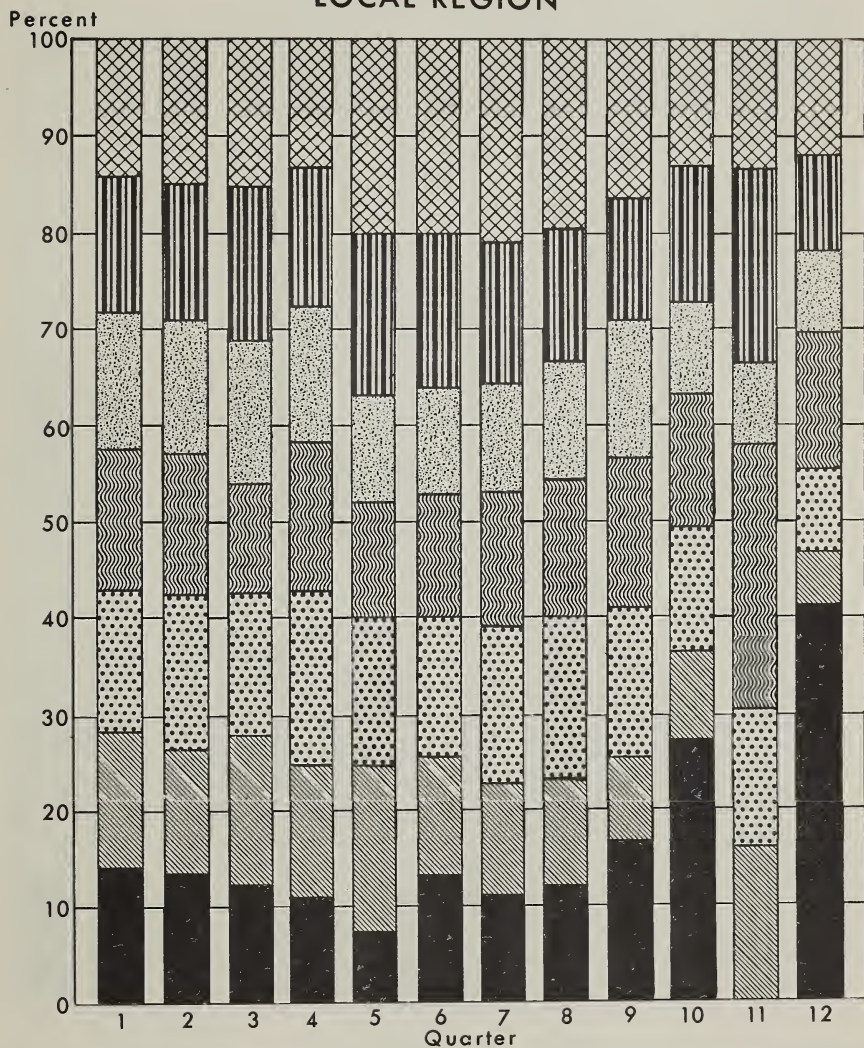
Simulation Exercise 5

TOTAL UNIT SALES BY SMALL COMPANIES, LOCAL REGION



Simulation Exercise 5

MARKET SHARE, PRODUCT A, LOCAL REGION

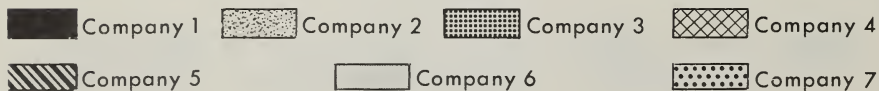
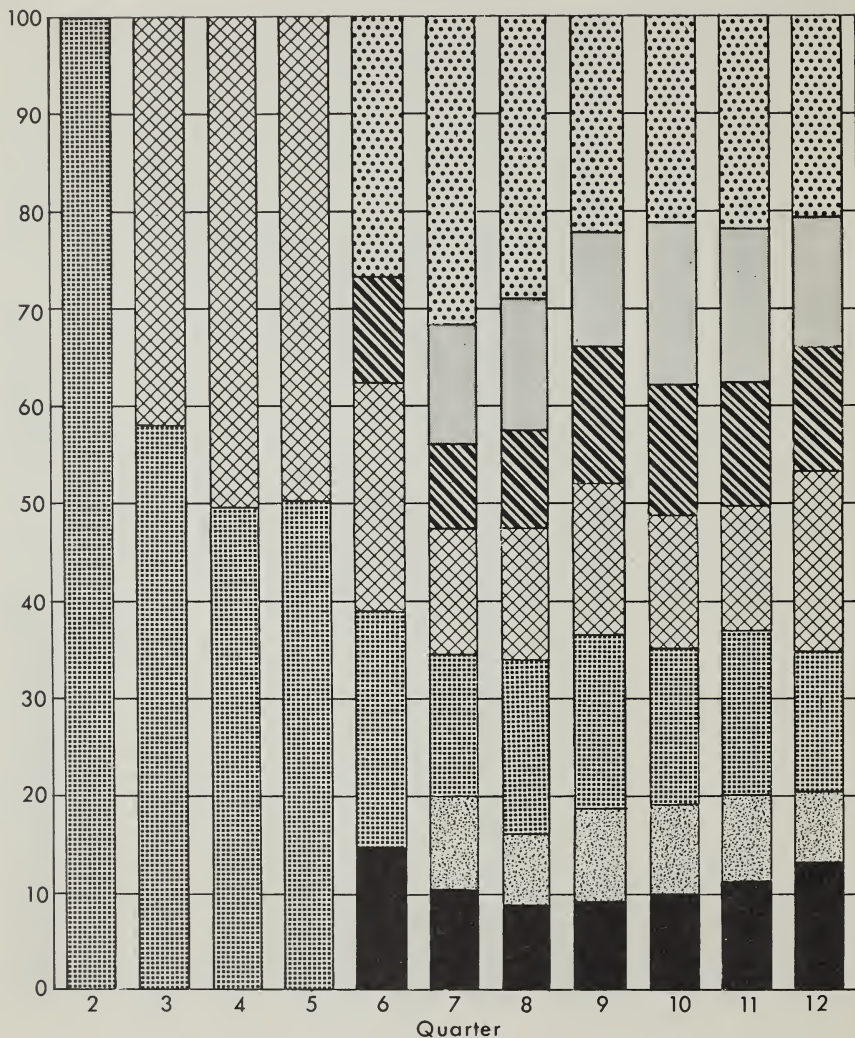


Company 1 Company 2 Company 3 Company 4
 Company 5 Company 6 Company 7

Simulation Exercise 5

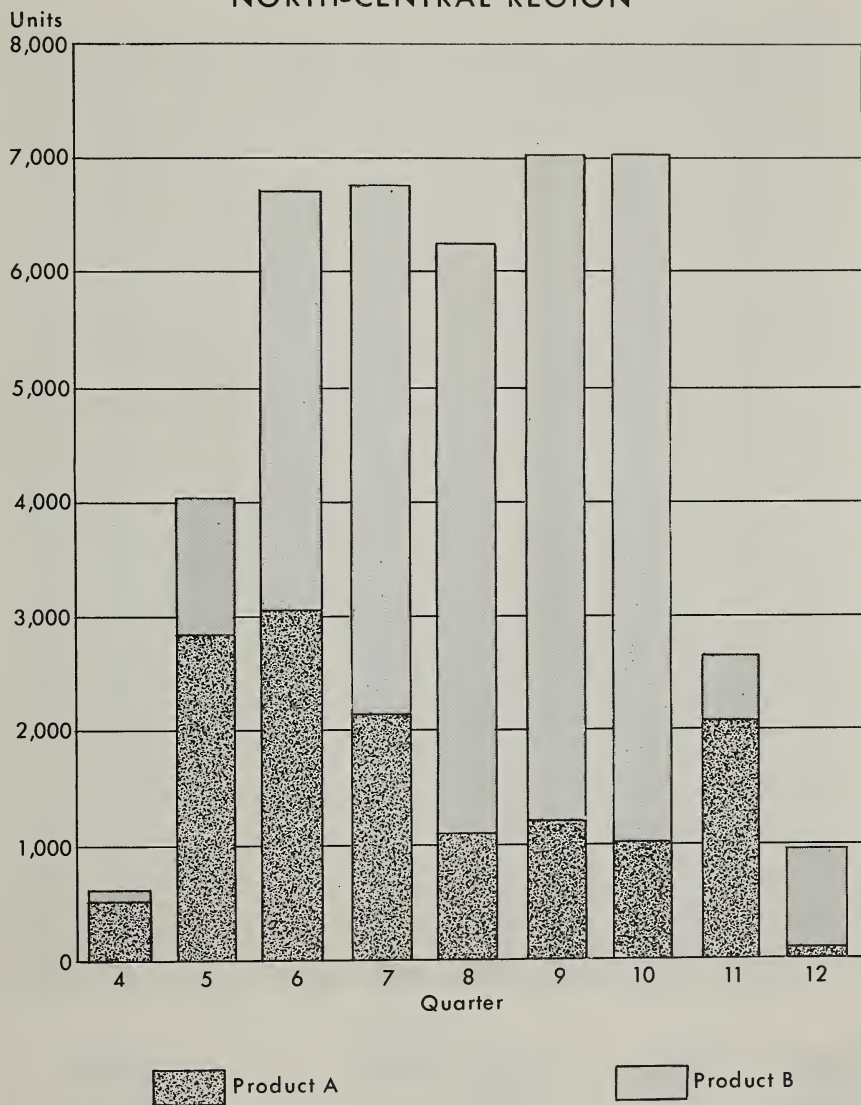
MARKET SHARE, PRODUCT B, LOCAL REGION

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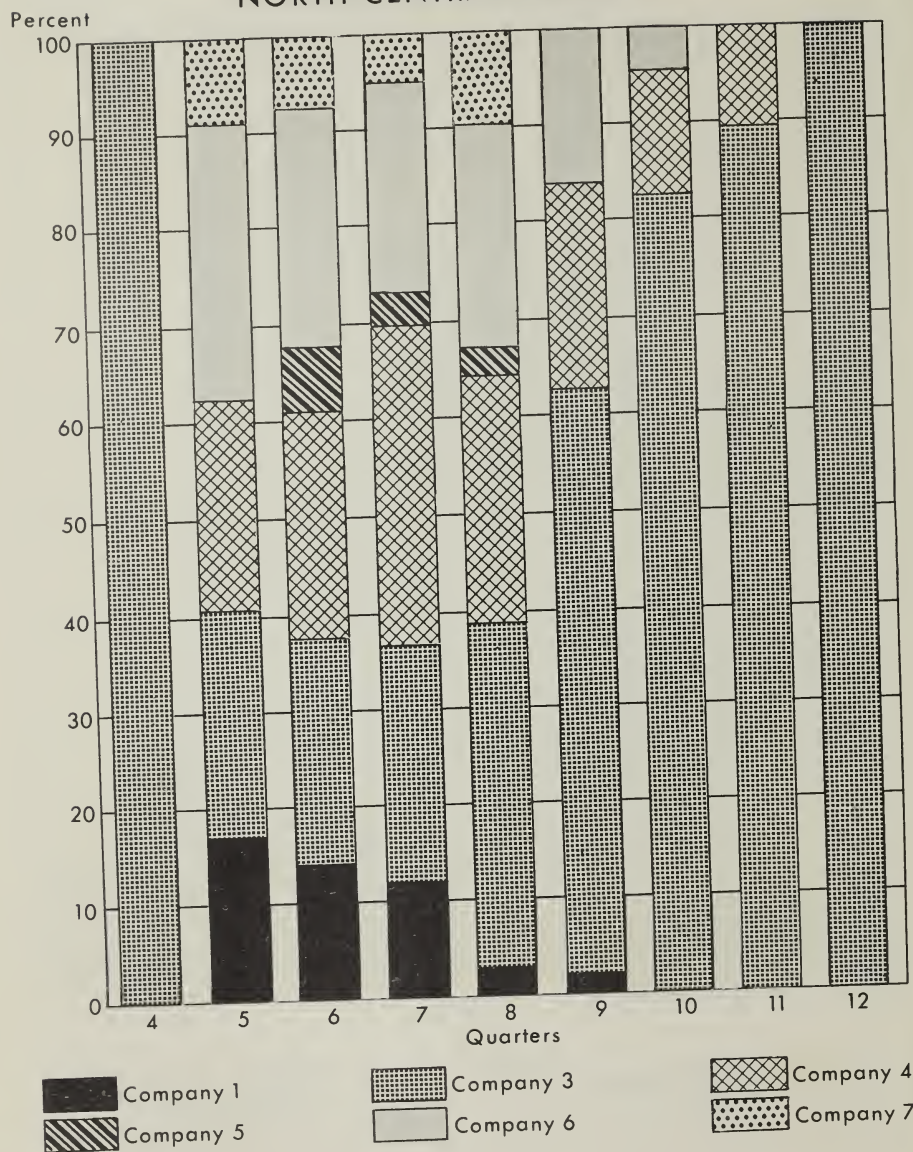
Simulation Exercise 5

TOTAL UNIT SALES BY SMALL COMPANIES, NORTH-CENTRAL REGION



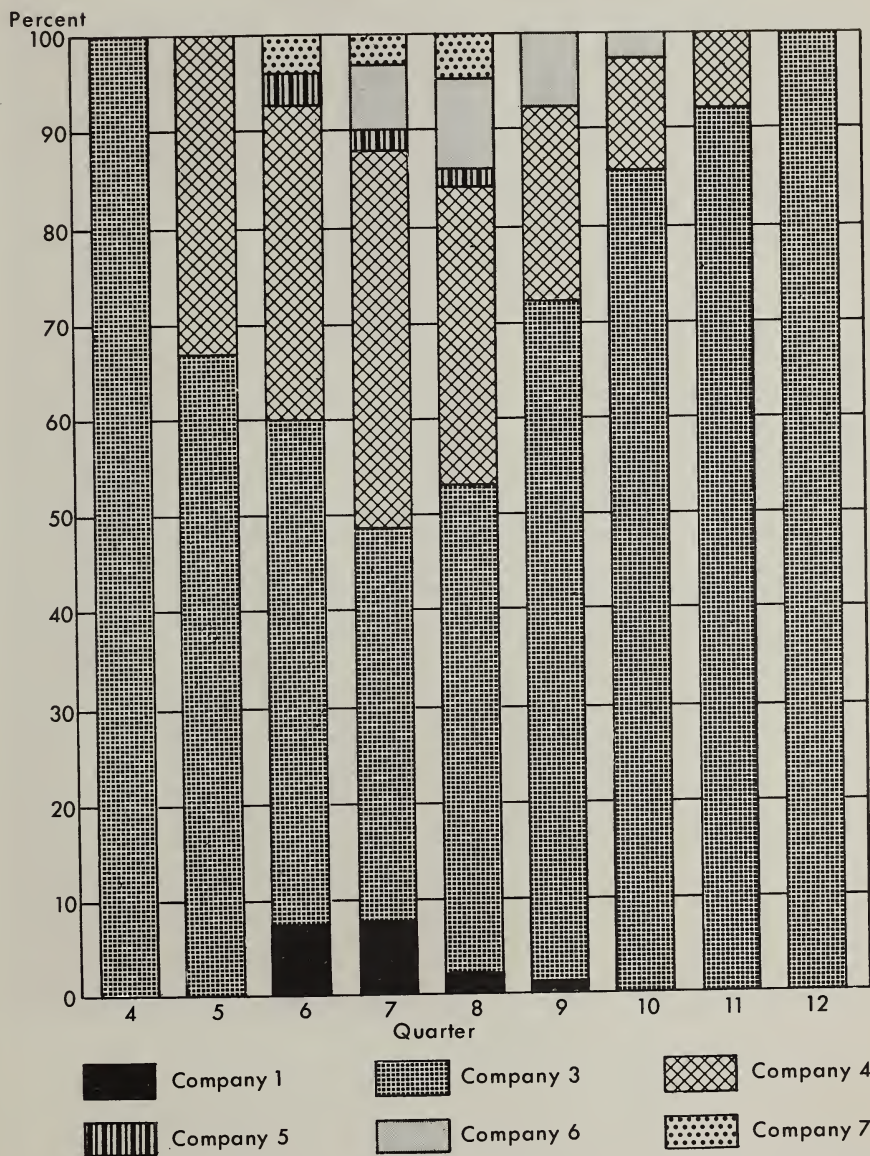
Simulation Exercise 5

MARKET SHARE, PRODUCT A, NORTH-CENTRAL REGION



Simulation Exercise 5

MARKET SHARE, PRODUCT B, NORTH-CENTRAL REGION



Simulation Exercise 5
QUARTERLY NET INCOME
 (ROUNDED TO NEAREST DOLLAR)

Quarter	Company											
	1	2	3	4	5	6	7					
1	4,587	5,582	3,678	4,721	5,099	5,179	4,481					
2	4,292	4,528	3,123	135	4,301	1,071	4,051					
3	2,246	- 531	1,551	1,157	5,628	6,700	358					
4	- 713	- 4,424	6,141	- 2,266	2,187	- 394	770					
5	- 2,614	- 44,430	- 2,286	1,564	- 5,640	- 8,277	472					
6	- 35,736	- 3,652	5,182	314	- 480	- 8,847	- 1,356					
7	- 7,518	1,671	2,946	6,190	4,541	997	5,899					
8	- 5,745	- 13,720	- 1,871	5,147	412	- 4,458	5,016					
9	- 28,013	- 16,068	6,770	3,420	1,458	- 1,649	8,226					
10	- 11,596	1,998	5,439	- 2,523	2,406	- 13,075	1,385					
11	- 9,226	4,875	- 30,733	- 7,909	- 3,428	- 16,023	4,171					
12	- 29,235	- 9,450	- 22,572	- 8,958	- 1,424	- 8,596	- 6,601					

SIMULATION EXERCISE 6: LUBBOCK

Exercise 6 was characterized by a very great interest on the part of the participants in gathering information needed to make wise decisions. The charts for this exercise are much the same as those for the others. But the charts do not tell the whole story. Almost every piece of information available in the information bank was requested at some time or other during the exercise. Even though the companies did not have any list of the items available, they were able to determine what sorts of information were needed and ask in such a way as to learn what could be secured. In the process, of course, they asked for much information that had not been prepared and kept the administrator busy providing material to send them.

A few of the questions which these participants asked are listed below:

1. How can we go about establishing a line of credit to meet future cash needs?
2. How much will it cost us to bring our machines back to full capacity?
3. How can we break into the consumer-durables market?
4. How can we go about expanding our sales territory?
5. Is it possible for us to arrange a special discount rate for some of our best customers?
6. How can we have an engineering study made to determine whether or not we have an efficient plant arrangement? What would such a survey cost?
7. Are there any by-products that we can produce using our present plant and equipment?
8. How do the salesmen's salaries and commissions paid by our company compare with those paid by our competitors?
9. Would it be more profitable for us to subcontract some of our production?
10. Would it be possible for us to buy additional information about the financial conditions of our competitors?
11. Can we sell to selected customers at a reduced price?
12. What is the labor situation in our plant? Is there any possibility that we might be subject to a strike during the next four quarters if we get a large contract?
13. Could we buy a survey that would tell us the likelihood of competition in our industry from the plastics industry?
14. What can we learn about the effectiveness of our advertising?
15. Are there any steps which we might take to automate our production line and reduce costs?

SIMULATION EXERCISE 6: LUBBOCK

<i>Simulation exercise team</i>	<i>Firm</i>	<i>Product</i>	<i>Number of employees in firm participating</i>	<i>Status of employees participating</i>
1	Johnson Manufacturing Company	Agricultural machinery	100-249	Top and middle management
2	Layne Pumps, Inc.	Irrigation equipment	8-24	Top and middle management
3	Quality Steel, Inc.	Sheet-metal fabrication	8-24	Top and middle management
4	Ralston Purina Company	Livestock and poultry feed	50-99	Top and middle management
5	Rodgers Litho, Inc.	Lithographing	8-24 8-24	Top and middle management
6	South Plains Associated Grocers	Wholesale grocery	4	Top and middle management
7	T.I.M.E. Freight, Inc.	Common carrier	50-99	Top and middle management
8	School of Business Administration, Texas Technological College	Education	n.a.	Faculty

Unfortunately, not all of the questions received by the administrator made as much sense as the ones listed above. A few indicated a frightening lack of knowledge by businessmen of basic accounting and business economics. Here are a few examples of this type of question:

1. Can we buy a new C machine and pay for it out of surplus?
2. This quarter we cut our price and hired a new salesman. How many more units of sales can we count on as a result of this action?
3. We seem to run out of cash each quarter. How can we figure so this won't happen?
4. How can we bid successfully on the Gigantic Prefab Contract without running the risk of selling below cost?
5. We understand from the manual that we can buy raw materials on contract at a lower cost. If we do this, how can we be sure that we won't get a larger inventory than we can use?

To the extent that the simulation helped the members of some of the companies to understand such ideas as "cash flow" and "break even," the exercise was a successful teaching device.

Some of the companies in Exercise 6 showed an unusual amount of imagination and ingenuity. One company worked up in great detail the plans for an incentive system in the plant. The work done on this plan was recognized by the administrator in such a way that increased production was possible over and above that normally expected with the work force and machinery available to that company.

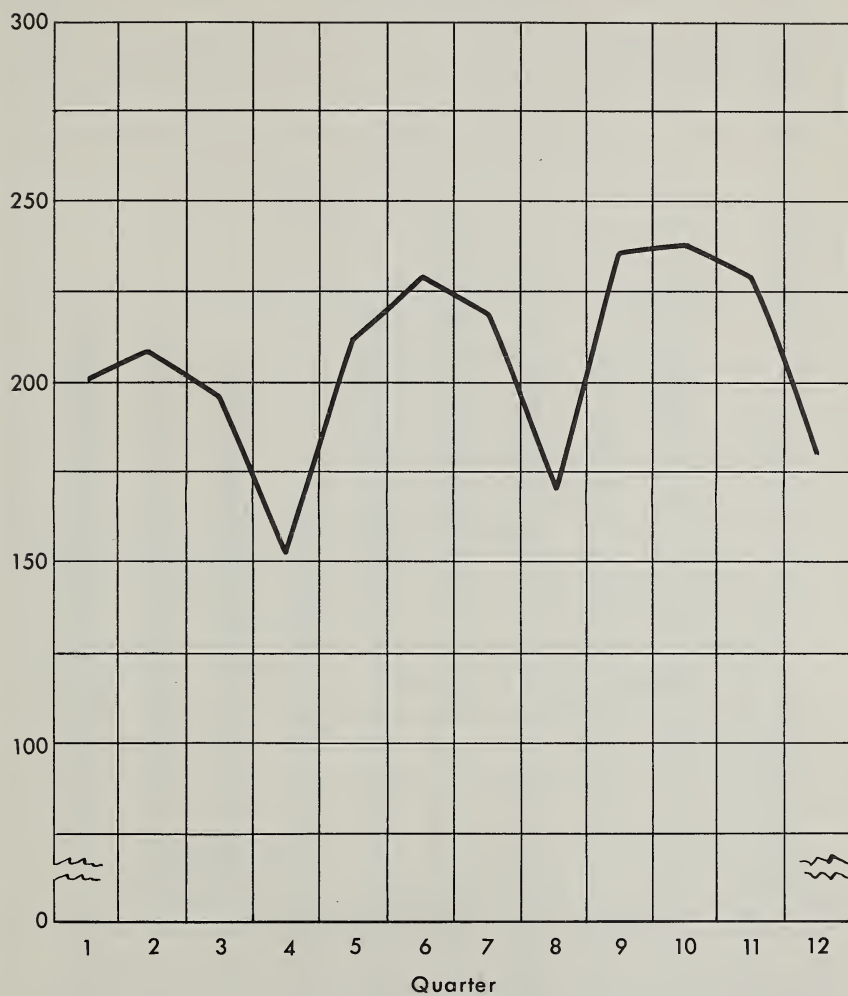
Another company concentrated on building an effective sales organization. In addition to paying good wages and high commissions, it bought country club memberships for its salesmen, put them through a stiff training program, and gave a special bonus at Christmas. By changing the constant in the computer program that represents "effective salesmen," the administrator was able to recognize in a quantitative form these qualitative actions on the part of that one firm.

At the end of this exercise, the administrator held a final critique session in Lubbock, Texas, at which all of the companies were represented. Each company president discussed the strategy of his company in engaging in the simulation, and suggestions were made for improvement. At the close of that meeting, everyone agreed that he had enjoyed the experience and had received a great deal of benefit from the simulation.

The president of Company 5 admitted that the reason his company was far ahead of some of the others in terms of profits was that they had become so

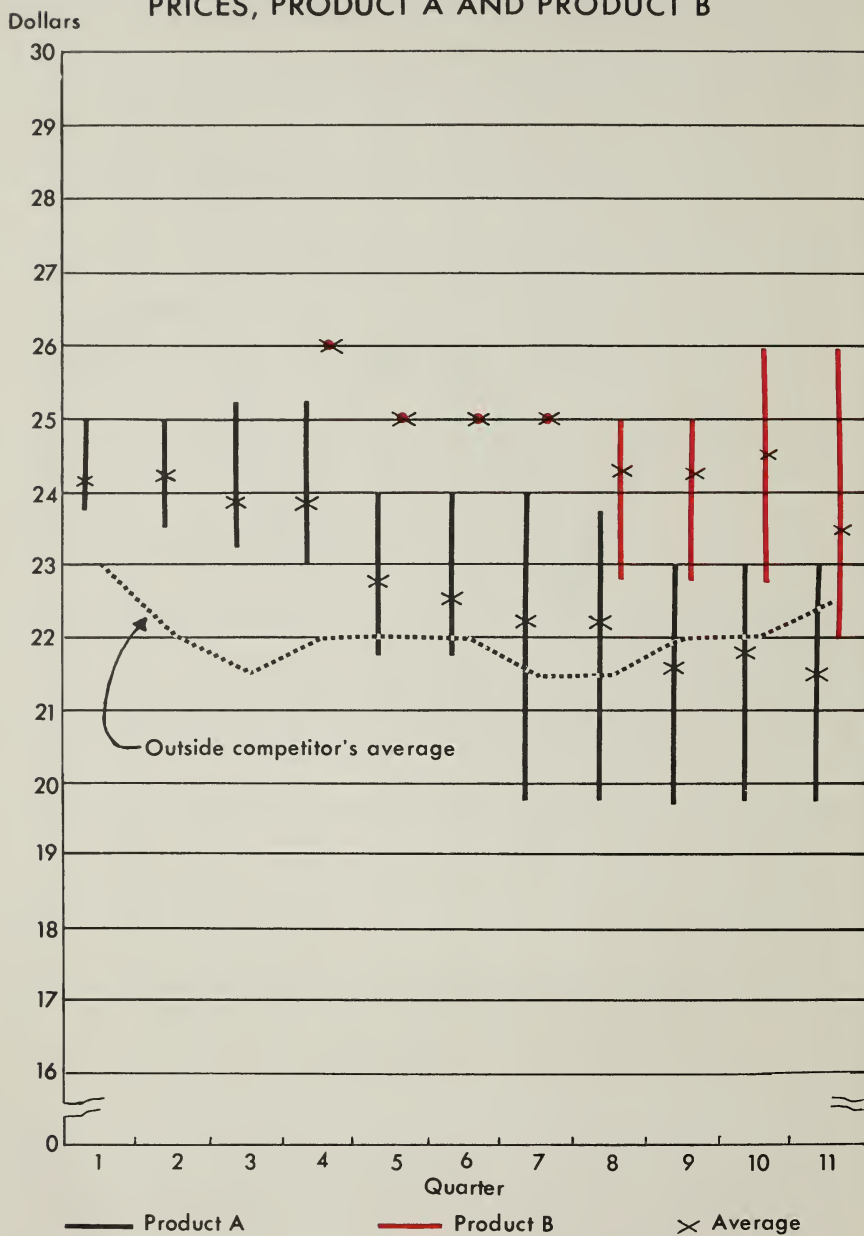
interested in the simulation that they had spent as many as ten hours a week in making their decisions. He felt that the time had been well spent.

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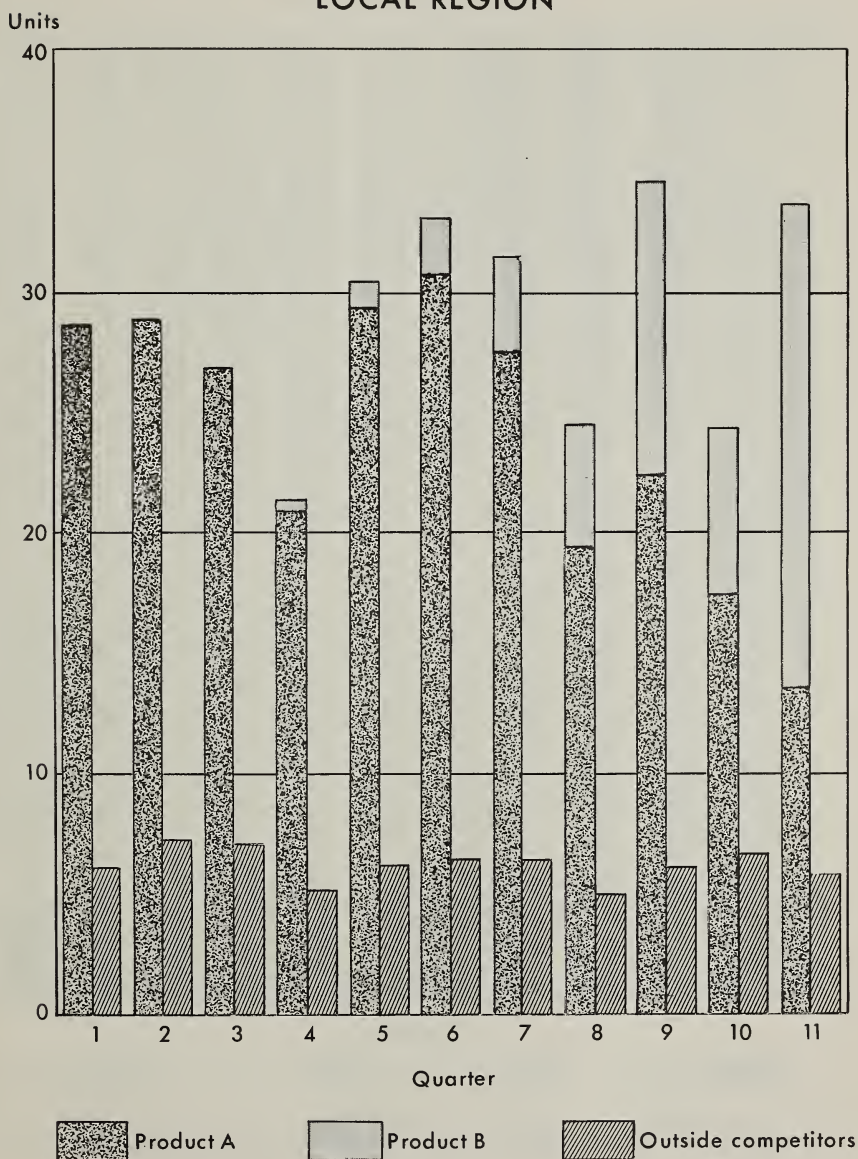
Simulation Exercise 6

PRICES, PRODUCT A AND PRODUCT B



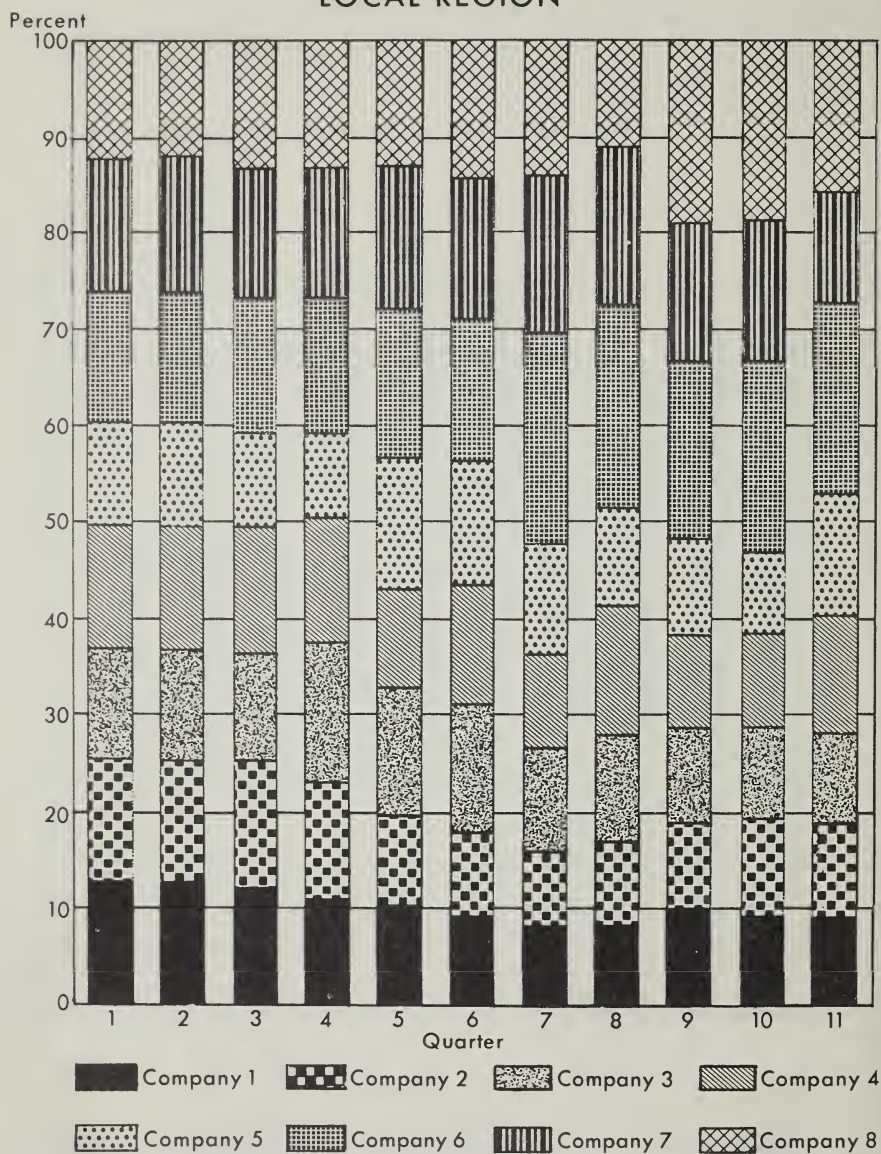
Simulation Exercise 6

TOTAL UNIT SALES, BY SMALL COMPANIES, LOCAL REGION



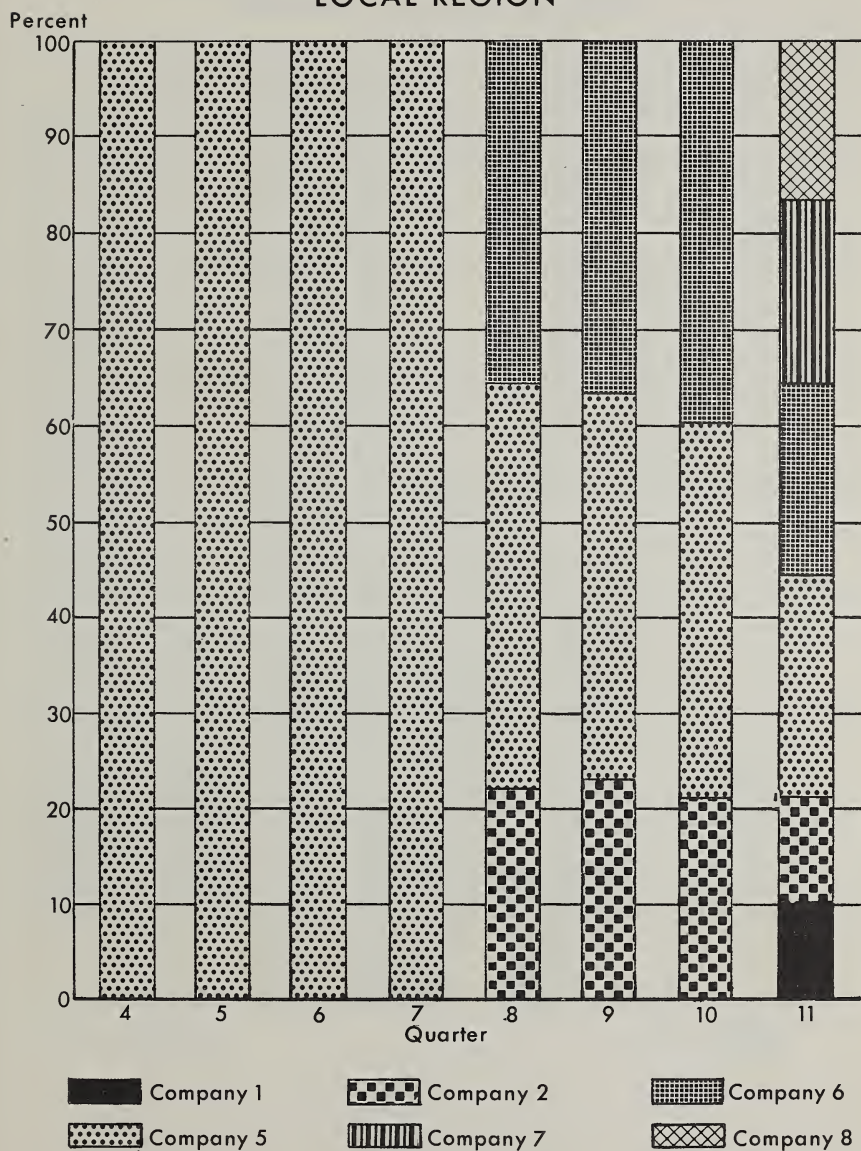
Simulation Exercise 6

MARKET SHARE, PRODUCT A, LOCAL REGION



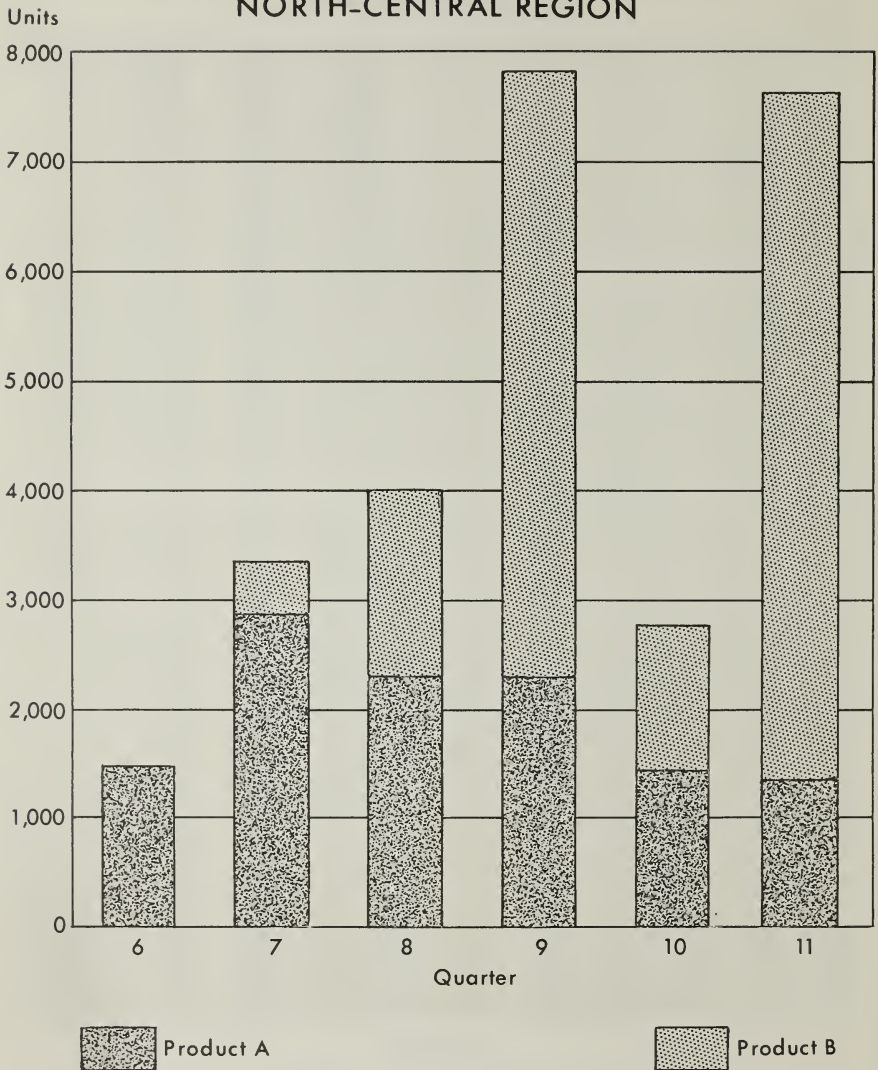
Simulation Exercise 6

MARKET SHARE, PRODUCT B, LOCAL REGION



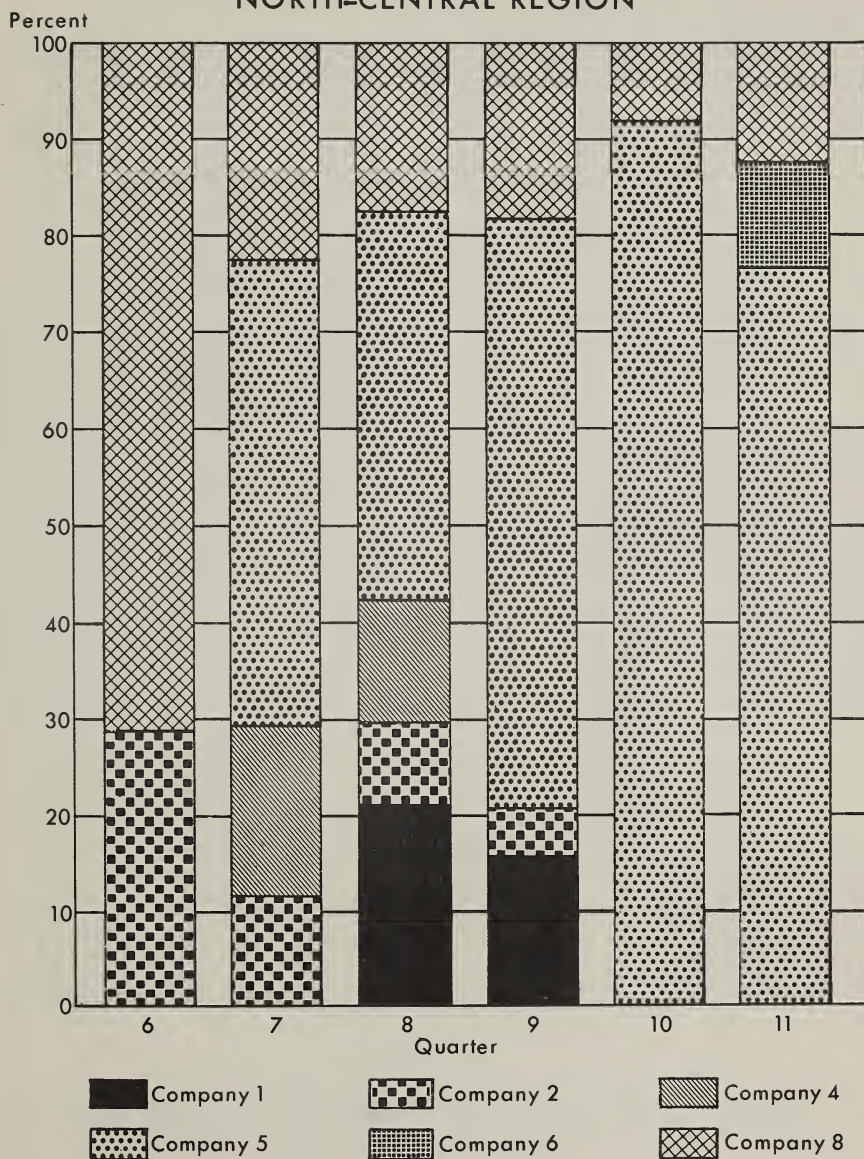
Simulation Exercise 6

TOTAL UNIT SALES BY SMALL COMPANIES,
NORTH-CENTRAL REGION



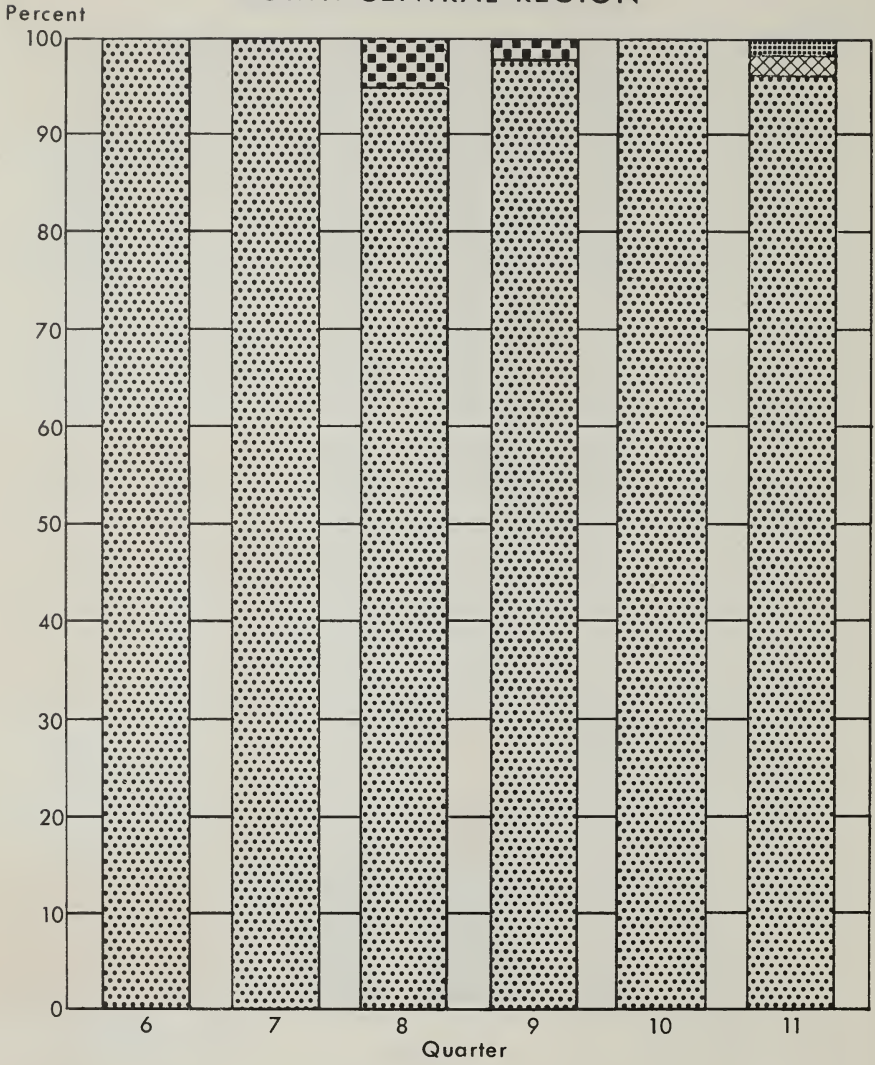
Simulation Exercise 6

MARKET SHARE, PRODUCT A, NORTH-CENTRAL REGION



Simulation Exercise 6

MARKET SHARE, PRODUCT B, NORTH-CENTRAL REGION



 Company 2
  Company 5
  Company 6
  Company 8

Simulation Exercise 6

QUARTERLY NET INCOME (ROUNDED TO NEAREST DOLLAR)

Quarter	Company							
	1	2	3	4	5	6	7	8
1	4,985	4,740	4,588	5,714	4,761	5,149	4,645	3,892
2	4,521	4,852	5,651	5,159	4,058	4,872	5,078	4,291
3	4,406	2,448	4,549	4,861	- 1,517	4,221	3,388	2,977
4	1,752	- 791	1,531	2,379	4,154	4,449	5,680	3,284
5	1,103	173	650	1,647	7,052	5,204	5,854	4,735
6	1,838	981	1,132	1,264	10,652	5,490	6,022	7,601
7	445	- 4,527	- 1,657	- 1,166	12,523	4,197	2,907	5,042
8	- 1,701	1,840	7,238	- 4,990	12,077	7,697	714	- 1,789
9	- 1,227	5,615	- 2,213	- 8,019	33,032	8,494	- 3,946	- 5,234
10	- 8,456	2,662	- 7,605	- 8,003	25,058	11,897	- 3,959	- 12,329
11	- 19,831	9,727	- 16,924	- 14,534	26,609	9,749	2,905	1,046

SIMULATION EXERCISE 7: SAN ANTONIO

The San Antonio exercise suffered from a number of internal scheduling difficulties, due largely to unexpected claims on team members' time in several of the participating firms, which made it necessary to delay the processing of a number of the decisions. Only eight sets of decisions were processed for this session before the mid-February 1962 terminal date. Despite these problems, the interest of the simulation teams remained high: at their request, a midpoint discussion session, in addition to the postsimulation meeting, was scheduled, with all of the participant groups attending both meetings.

The San Antonio groups tended to be more conservative and less active than the groups in other exercises, particularly in searching for modifications to the initial conditions of the simulation. This is exemplified in the accompanying charts, which indicate that the new product was introduced during a relatively late stage and that the North-Central region was not entered by any company.

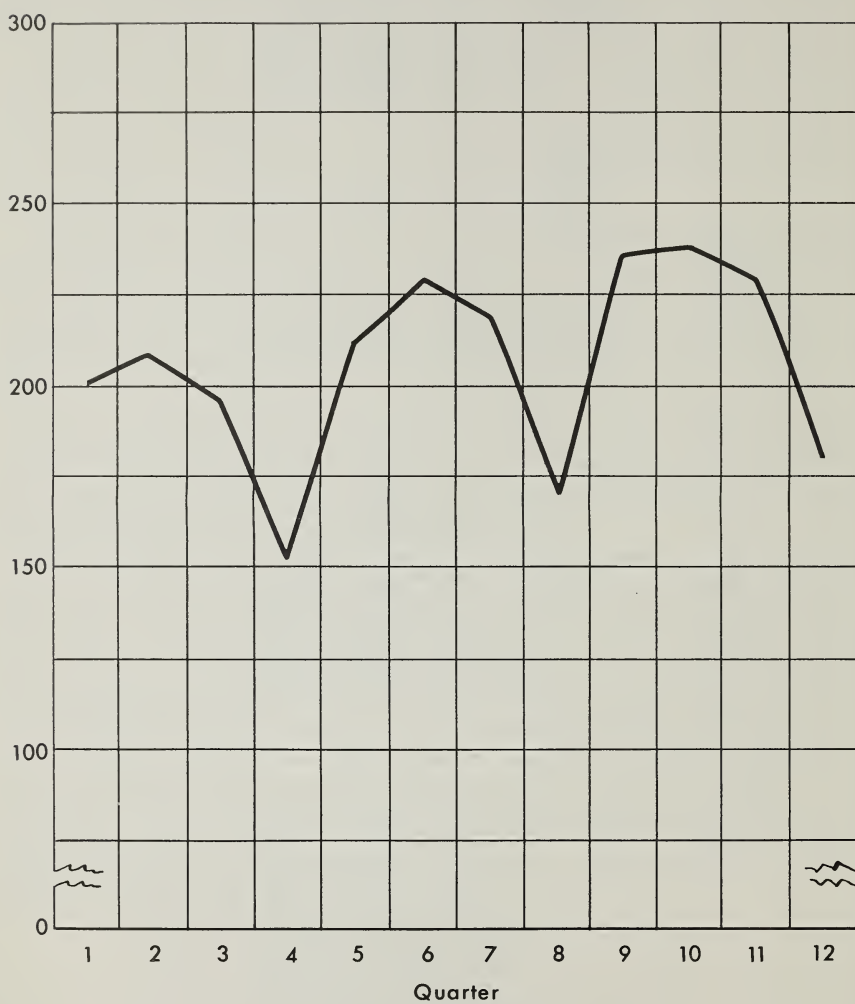
An interesting and significant feature of the San Antonio exercise was the manner in which the participants adapted to the conventions of the simulation and increasingly tended to seek solutions consistent with the nature of the responses observed within the simulated environment.

The discussion in San Antonio at the midpoint of the exercise was most fruitful in preventing participant frustration resulting from feelings that the model was not realistically constructed because decisions did not produce anticipated results. In answer to criticisms that unreal responses were being generated by the model (interestingly, the model was criticized by two groups of participants for opposite reasons on the question of price sensitivity), it was pointed out that different environments exist in the real world also, that it is frequently invalid to transfer concepts appropriate to successful behavior in a given real situation to a second real situation. It was further emphasized that simulated problems in rational adaptive behavior can help to train executives to meet problems in required behavior in the real world.

SIMULATION EXERCISE 7: SAN ANTONIO

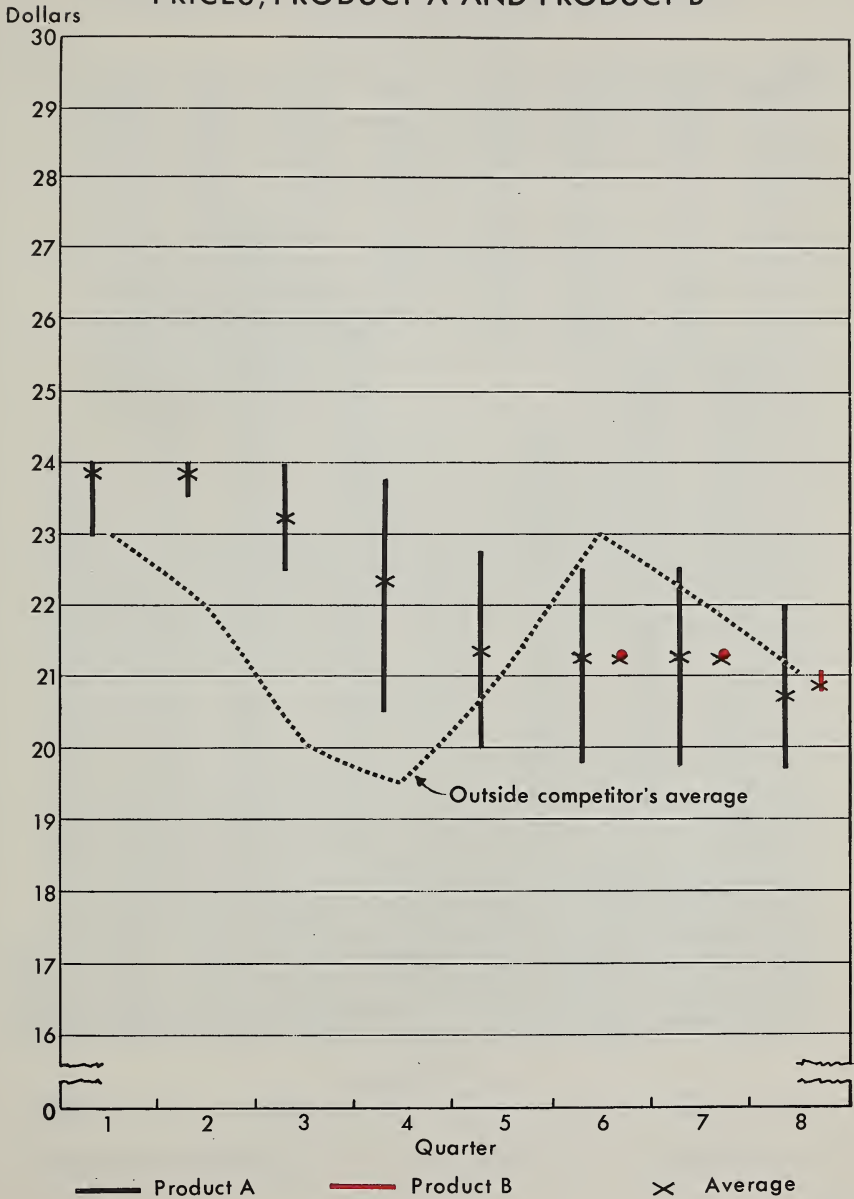
<i>Simulation exercise team</i>	<i>Firm</i>	<i>Product</i>	<i>Number of employees in firm</i>	<i>Number of employees participating</i>	<i>Status of employees participating</i>
1	Juvenile Manufacturing Company	Apparel	250-499	2	Middle management
2	Reliance Manufacturing Company	Laboratory equipment	100-249	6	Middle management
3	General Foods Corporation	Sales organization	n.a.	5	Middle management
4	H. B. Zachry Company	Construction contractor	n.a.	4	Middle management
5	Lone Star Brewing Company	Brewing	500 +	6	Middle management
6	Handy Andy, Inc.	Supermarket chain	n.a.	5	Middle management
7	Campbell Steel Company	Structural steel	100-249	5	Middle management
8	St. Mary's University	Education	n.a.	4	Faculty

INDEX OF CONSTRUCTION ACTIVITY



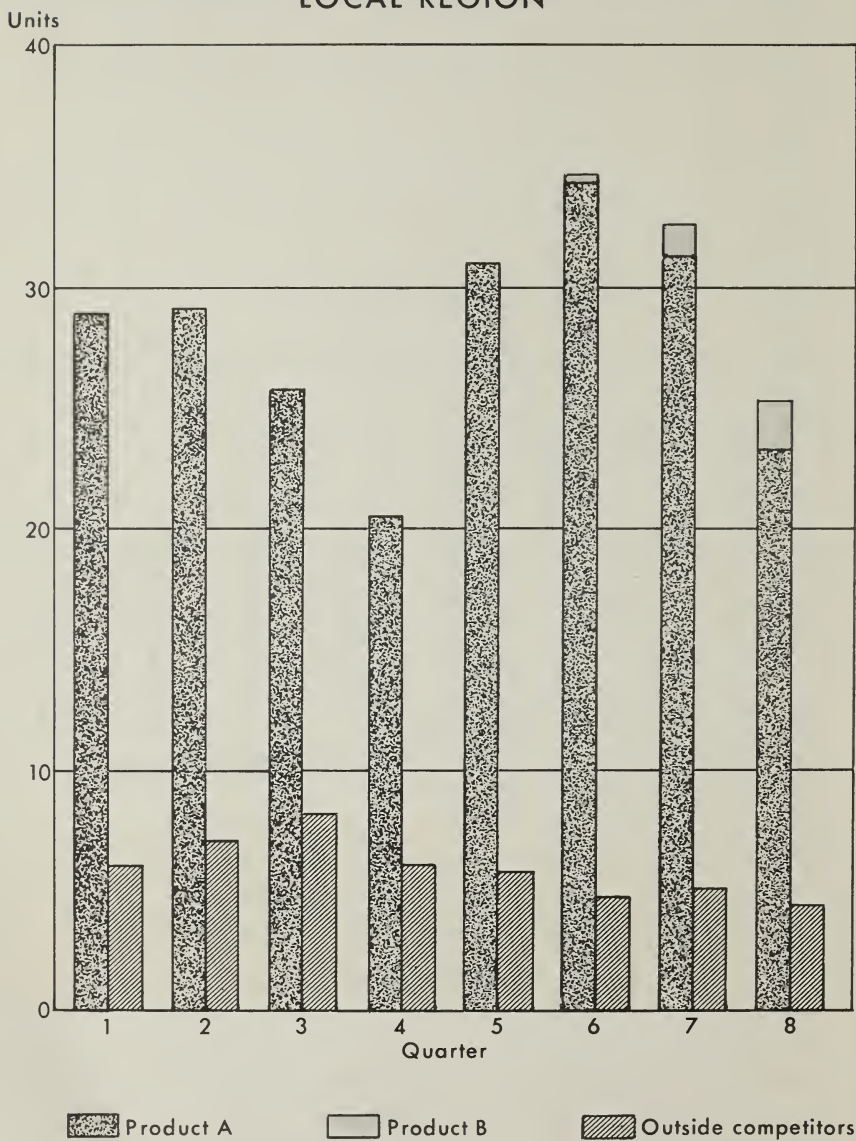
Simulation Exercise 7

PRICES, PRODUCT A AND PRODUCT B



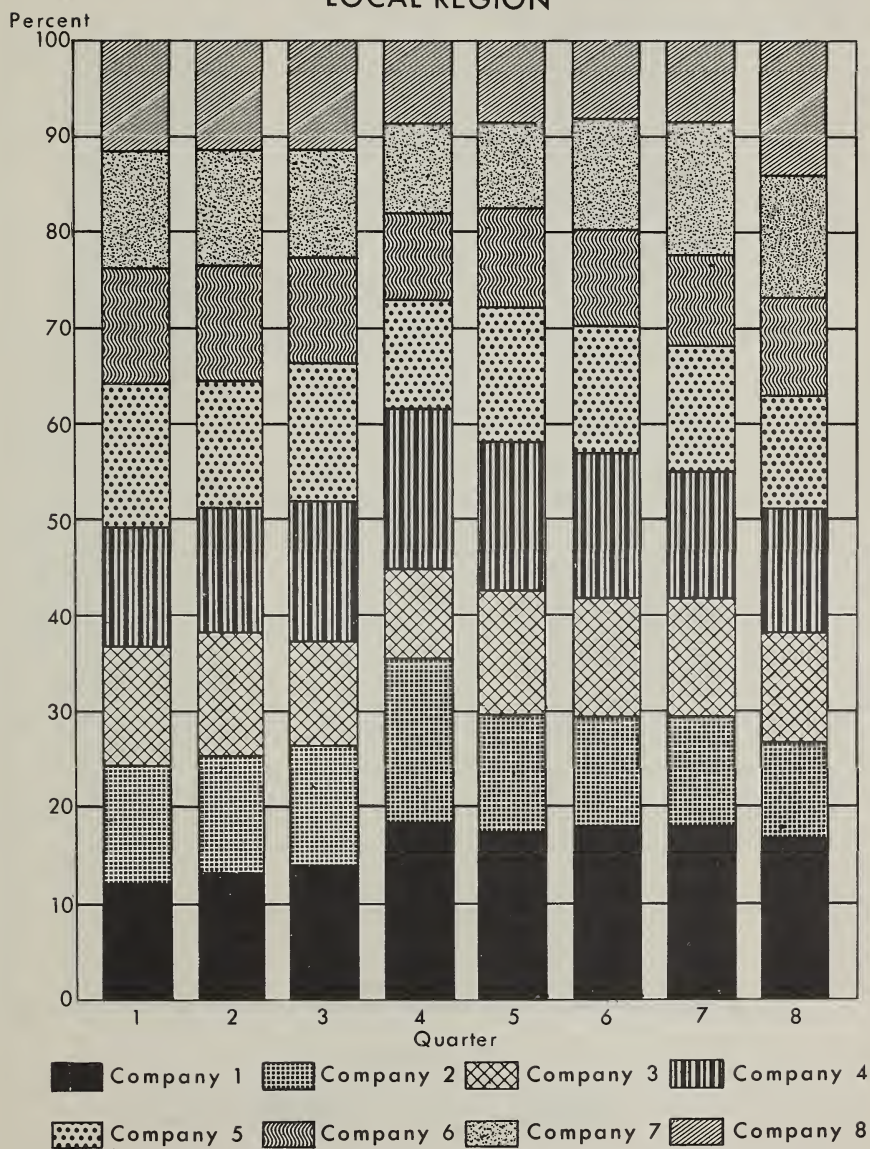
Simulation Exercise 7

TOTAL UNIT SALES BY SMALL COMPANIES, LOCAL REGION

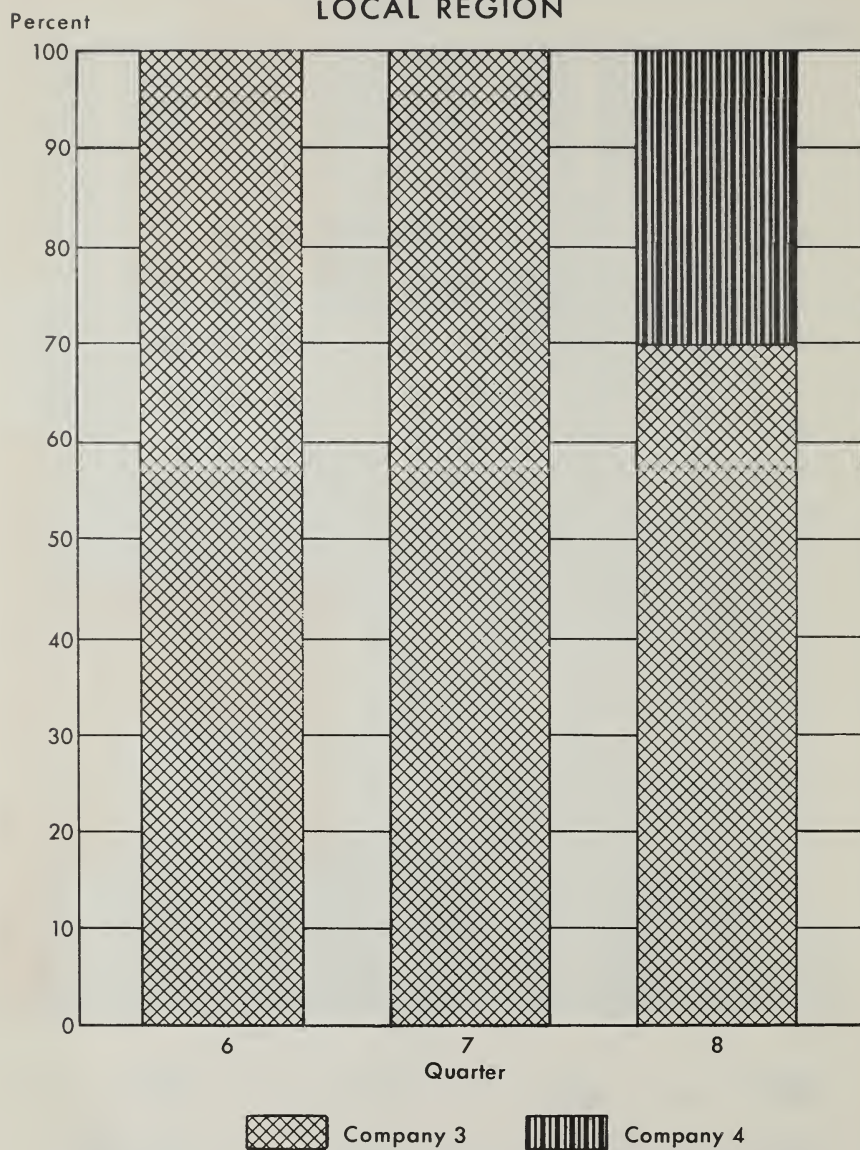


Simulation Exercise 7

MARKET SHARE, PRODUCT A , LOCAL REGION



Simulation Exercise 7
MARKET SHARE, PRODUCT B,
LOCAL REGION



Simulation Exercise 7
QUARTERLY NET INCOME
 (ROUNDED TO NEAREST DOLLAR)

Quarter	Company							
	1	2	3	4	5	6	7	8
1	4,273	4,954	4,441	5,250	4,032	4,610	5,156	4,675
2	5,062	4,343	2,561	3,343	3,657	4,303	4,807	5,443
3	7,430	2,573	5,074	5,480	7,351	1,387	1,573	3,918
4	3,685	- 492	- 8,011	3,450	2,627	- 2,946	- 1,697	604
5	5,057	3,784	-12,152	4,184	4,055	- 8,632	- 3,278	- 996
6	5,956	879	-11,772	4,176	4,166	- 1,150	1,028	- 989
7	3,640	- 1,502	- 3,929	7,076	2,454	1,236	2,676	- 984
8	- 2,614	- 5,794	- 9,598	- 3,338	23	- 2,980	- 286	- 8,894

Chapter IV

Summary and Conclusions

ADMINISTRATIVE TECHNIQUES

Experience with the seven simulation exercises, as described in the two preceding chapters, suggests that this technique may be successfully applied in small business executive development programs. The two great advantages accruing to a simulation exercise organized along these lines are: (1) the possibility of efficiently and flexibly integrating program activity with other demands on the participant's time and (2) the extremely high motivation and interest of participants in the problems generated in the simulation. Even though the simulation exercises in this testing program extended over a period of approximately five months, there was no significant diminution of interest. Accordingly, extended sessions operated under a centralized administrative and processing arrangement appear to offer a feasible new approach in small business executive training and development. Based on experience with the seven experimental exercises reported here, the major requirements appear to be:

1. *Competent central administration*—Processing data and information requests for an average exercise involves one to two hours for the simulation administrator, fifteen to thirty minutes of keypunching time, and two to five minutes of computer time, exclusive of printing time.
2. *Inclusion in the facilities (as discussed in the earlier report) of a large-sized digital computer*—The simulation programs have been successfully compiled and executed on an I.B.M. 7070 with 10,000 words of core and have been run at The University of Texas on a Control Data 1604 with approximately 32,000 words of core. Systems of this type are necessary for efficient execution of the program.
3. *Local liaison in remote locations*—Such liaison is necessary to maintain

decision mailing schedules, arrange joint meetings, and handle other local problems.

4. *Adequate participant orientation*—Prior to the simulation exercises, adequate orientation of participants is essential. Such orientation should include a joint briefing session conducted by the administrator.
5. *In-simulation discussion session*—At least one discussion session should be scheduled to increase feedback from the administrator and to discuss progress with the participants during the course of the exercise.
6. *Postsimulation discussion session*—A postsimulation session should also be planned to provide a critique of the activities which took place during the simulation exercise.
7. *Minimum ten-day decision cycles*—Decisions should not be scheduled at less than ten-day intervals, even if immediate access to a computer is possible. A fourteen-day decision cycle would probably be more feasible. No marked lapses in the continuity of exercises were noted with intervals of this length.
8. *Minimum twelve-decision simulation exercises*—A simulation exercise should cover approximately twelve decisions. On a ten-day to fourteen-day decision cycle, an exercise of this length would run for five to six months.

SIMULATION AS A TRAINING DEVICE

Based on observation of the experimental simulation exercises and on discussion with the participants, it is evident that simulation has unusual potential as an effective training medium. It must be recognized, however, that engaging in a simulation exercise is not in itself a necessary and sufficient training experience for a participant. It is essential for the actions taken, and the mistakes made, by participants in the simulation to be the subject of relatively frequent parallel discussion and analysis. Under these conditions, teaching via a simulation experience possesses far greater impact than more conventional methods.

The small business simulation developed at The University of Texas is primarily suited for middle-management training in larger "small businesses" (e.g., 200 to 500 employees) and for top-management training in the smallest companies. It appears to have particular training value in the following respects:

1. Use and analysis of internal accounting data for control and planning for the total enterprise.

2. Use and analysis of environmental information as a basis for the rational planning of future operations.
3. Appreciation of the functional relationships existing within the total enterprise and of the necessity for coordinated decision-making.
4. Recognition of the need for adaptive behavior in responding to the demands of a particular environment, and, in particular, the need for objectively evaluating environmental information and acting upon it, rather than upon preconceived notions of correct behavior.
5. Illustration of the importance of specific basic principles that may be clichés but which are, nevertheless, crucial to the survival of a firm and which play a particularly significant role in the simulated situation.

Thus, preservation of a strong working capital situation is essential to success in the simulated environment. Unbalanced inventory positions tend to cumulate in the simulation. All businessmen pay lip service to the need for inventory control and adequate working capital positions. The disastrous consequences arising from a neglect of these basic requirements in the simulation exercises had an obvious impact upon the participants and almost certainly made a greater impression on their future thinking than any amount of conventional discussion could have done.

6. Use of the simulation as a vehicle for teaching additional institutional facts through associated role-playing, such as simulated labor-contract negotiations and bank-loan procedures, within the economic and fiscal context of the simulation exercise.

It was the observation of the administrative group, reinforced by the comments of the businessmen participating, both during and after the experimental simulation exercises, that simulation provides an interesting and challenging new dimension in small business executive development.

One of the primary values of a simulation is that it provides an initially imperfectly known environment and imposes on the participants the problem of defining a successful behavior pattern consistent with its characteristics. As such, the simulated problem is an exercise in rational adaptive behavior. Viewed and understood in this light, the simulated problem can be a powerful object lesson for required behavior in the real world. A major problem encountered in the early stages of any simulation is the resistance of participants to elements they consider to be unreal or inconsistent with their own experience. It is not uncommon for participants to pursue a line of behavior that is demonstrably

unsuccessful in terms of the simulation payoffs, simply because the experience and expectations valid in their real business environment lead them to believe that such actions are necessarily correct. For example, concepts of price elasticity of demand are frequently carried over to the simulated environment as are concepts of promotional elasticity. If responses in the simulated environment are at variance with a participant's expectations, a common initial reaction is that the simulation model is somehow "wrong." It is important in any simulation exercise to anticipate this type of reaction in order to prevent participant frustration.

Adaptability to the problems of a new environment, involving the discovery of solutions appropriate to its particular parameters, is an element of successful business behavior that is at least as important as the possession of adequate analytical skills. In this context, a business simulation is far more than just a competitive activity or game—it is an exercise in adaptability. If it is recognized as such, the simulation exercise should provide useful insights into the approach to real problems where this quality may be essential and where the stakes will be much higher. It is paradoxical that the small businessman, usually possessing a less sophisticated insight into the problems of corporate decision-making than his counterpart in the large firm, must be capable, nevertheless, of more consistently successful decision-making behavior if he is to survive. In general, the small businessman does not possess the resources to cushion the consequences of poor decisions.

For social and economic reasons, it is important to minimize the rate of small business failures and to increase the efficiency of small business enterprise. These simulation experiments have suggested a new approach to business education for the executives of small enterprises. The authors of this project hope that their expectations regarding the value of simulation as a training device for the small businessman will be realized.

APPENDIXES

Information for Local Project Representatives and Participants

- A. Locations and Schedules**
- B. Instructions to Local Project Representatives**
- C. Instructions to Participants**

APPENDIX A

Locations and Schedules

Locations

<i>Exercise number</i>	<i>Location</i>	<i>Date of briefing</i>	<i>The University of Texas administrator</i>	<i>Local project representative</i>
1	Beaumont	September 15	A. G. Dale	C. T. Kirksey
2	Dallas	September 14	F. B. May	L. I. Bakony
3	El Paso	September 15	C. T. Clark	W. J. Hartrick
4	Fort Worth	September 15	F. B. May	A. F. Murph
5	Houston	September 14	A. G. Dale	B. J. Hodge
6	Lubbock	September 14	C. T. Clark	F. W. Norwood
7	San Antonio	September 6	A. G. Dale	W. Hickey

Time Schedules for Mailing Decisions

<i>Quarter number</i>		<i>Location of exercise</i>						
		<i>San Antonio</i>	<i>Lubbock</i>	<i>El Paso</i>	<i>Dallas</i>	<i>Fort Worth</i>	<i>Houston</i>	<i>Beaumont</i>
	<i>September</i>	<i>September</i>	<i>September</i>	<i>September</i>	<i>September</i>	<i>September</i>	<i>September</i>	
1	6	14	15	14	15	14	15	
2	13	25	26	25	26	25	26	
3	23	<i>October</i> 4	<i>October</i> 5	<i>October</i> 4	<i>October</i> 5	<i>October</i> 4	<i>October</i> 5	
4	<i>October</i> 2	14	16	14	16	14	16	
5	12	24	25	24	25	24	25	
6	21	<i>November</i> 2	<i>November</i> 3	<i>November</i> 2	<i>November</i> 3	<i>November</i> 2	<i>November</i> 3	
7	31	13	14	13	14	13	14	
8	<i>November</i> 10	22	24	22	24	22	24	
9	20	<i>December</i> 1	<i>December</i> 4	<i>December</i> 1	<i>December</i> 4	<i>December</i> 1	<i>December</i> 4	
10	30	11	12	11	12	11	12	
11	<i>December</i> 8	19	20	19	20	19	20	
12	18	29	29	29	29	29	29	

APPENDIX B

Instructions to Local Project Representatives

INTRODUCTION

The purpose of this project is to test The University of Texas business simulation model by conducting the exercise with businessmen in seven Texas cities.

Much of the success of the project depends upon the enthusiasm and efforts of the local project representative in each city.

SELECTION OF THE SIMULATION TEAMS

Each exercise will be conducted with from five to not more than ten teams or firms. Six or seven teams (i.e., simulated companies) appear to be best.

Each team or company should begin participation with from three to five members. If necessary, substitutions may be made on teams as the exercise progresses to replace team members who are ill, on vacation, or who must drop out for one reason or another.

Experience has shown that it is desirable that a team be made up of the officers and employees from only one company.

Any type of business enterprise may be represented. A variety of small business operations is best.

One simulated company may be made up from local college or university faculty, if desired.

As soon as the companies have been selected, a complete list of all members with their addresses and telephone numbers should be mailed to the administrator in Austin. Changes in company membership should also be reported promptly, as soon as they take place during the exercise.

LOCAL BRIEFING

Each simulation exercise will begin with a briefing session to be held in the city where the exercise will be conducted. Dates for the briefing sessions are shown on the attached sheet. If for any reason the date planned for a particular city is not convenient, arrangements may be made with the administrator for a different date.

The briefing session will require approximately two hours, which will include the time necessary for each team to make its first set of decisions. It is suggested that a luncheon or supper meeting be planned to either precede or follow the briefing. The administrator will bring the first set of decisions with him back to Austin for processing.

The location, time, and details for the briefing should be arranged by the local representative, but the briefing itself will be handled by the administrator.

The local representative may plan to use the briefing session to get the teams acquainted with one another, to pass out time schedules and other pertinent information to the teams, and to answer questions as to how the exercise will be conducted in his city.

The key to a successful simulation exercise lies in a well-planned briefing session.

TIME SCHEDULES FOR THE SIMULATION EXERCISES

A schedule of the mailing dates for decisions is attached. (A break of one week sometime during the exercise is anticipated when the Control Data 1604 computer is moved to the new computation center on The University of Texas campus.)

Decisions will be mailed directly by the participating teams to:

Administrator [*give his name*]
Bureau of Business Research
The University of Texas
P. O. Box 7459, University Station
Austin 12, Texas

In an emergency, the administrator may be called in Austin at Greenwood 1-1616.

DECISION REPORTS FROM THE SIMULATION TEAMS

Each team should use the following list in making up its quarterly report for mailing:

- Routine-decision record
- Special quarterly expenses
- Nonroutine-decision record (if necessary)
- Information requests to the administrator (if any)
- Requests for additional forms (if needed)

If a report is not received in time for processing, the last set of decisions for that team will be reused for the current period. This is necessary to keep the schedule arranged with the computation center and to keep each exercise on schedule.

It is extremely important that each team identify each of its reports with both exercise number and its company number.

REPORTS TO THE COMPANIES

After the decisions have been processed on the computer, each team will receive from the administrator by mail the results of its decisions. The results will be in the following form:

- Income statement
- Balance sheet
- Status report
- Market information report

Each team will also receive:

- Association Newsletter*
- Answers to information requests made with previous mailing
- Additional forms, if requested

RESPONSIBILITIES OF THE ADMINISTRATOR

Provide all of the materials needed for the exercise with the exception of any instructions provided by the local representatives.

Handle the briefing to begin the exercise.

Check decisions prior to evaluation by the computer.

Answer all information requests and consult with the local project representative on any problems which might arise during this exercise.

RESPONSIBILITIES OF THE LOCAL PROJECT REPRESENTATIVE

Secure the teams that will participate in the exercise and report this information to the administrator in Austin as soon as possible so that participants can secure copies of the *Operating Manual* before the briefing session.

Make arrangements for the briefing session.

Check regularly with members of the teams in this exercise to be sure that each team is functioning and that decisions are sent in to Austin by the designated time.

Answer as many questions as possible from teams in this exercise. Any question he cannot answer may be referred to the administrator.

Prepare instructions for participants in his city (including names, addresses, and telephone numbers of team members, decision dates, etc.).

Prepare local press releases.

Arrange final evaluation session.

APPENDIX C

Instructions to Participants

GENERAL INSTRUCTIONS

The simulation exercise in which you will be engaged reproduces the competitive environment and operational problems of a number of small, competing manufacturing companies.

As a member of the management group of one of these simulated companies, you will be required to make periodic decisions covering the operations and marketing strategy of your simulated firm for the next three months. After decisions have been reached by all companies in this industry group, these decisions will all be fed simultaneously into the computer, which will then evaluate the outcome for each company, taking into account the market and demand conditions currently appropriate to the industry as well as the effects of competition among companies. The computer will then print out a quarterly income statement, balance sheet, and status report for your simulated company, reflecting your firm's performance over the quarter in question. After receiving these financial statements, your team will then make another set of decisions, and the sequence described above will be repeated.

The structure of this simulation model is quite complex, and the reactions generated in the model have been made as realistic as possible. For these reasons, no freak "solutions" exist in the game any more than in the real world.

PLAN FOR THE SESSION

At the initial briefing meeting, the administrator of your exercise will review the *Operating Manual*, which contains all relevant background material on your simulated company necessary for your first set of decisions. Copies of the *Operating Manual* will be given participating teams a week or so before the briefing session, and it is important for members of each team to familiarize themselves with the manual before the meeting.

Participating teams will receive, at the briefing session, complete kits of materials necessary for recording decisions, requesting information, etc., and the administrator of the simulation exercise will discuss their use in detail.

The final one to two hours of the briefing meeting will be utilized by each of the teams to make its first decision.

Subsequent decisions will be made by participating teams on their own time,

Date Due

Due Re ned Due Returned

at approximately ten-day intervals. Decisions will be mailed to Austin on the dates specified in the attached schedule. They will be processed and run on the Control Data 1604 computer at The University of Texas, and results normally will be mailed back to the teams on the second day after the receipt of decisions.

Because all decisions in a simulation exercise must be processed simultaneously, it is most important for each participating team to insure that decisions are mailed as scheduled.

In case that unanticipated difficulties or problems arise during the exercise, you should contact your local project representative.

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